UNIV... OF NEBRASKA AGRICULTURAL LIBRARY JUL 16 1946

evoted to
EXTILE
EMISTRY
LEACHING
DYEING
RINTING
NISHING

LY 1, 1946
UME 35, No. 13

AMERICAN

DYESTUFF REPORTER

IAL PUBLICATION
of the
ROCEEDINGS
CAN ASSOCIATION
EXTILE CHEMISTS
ND COLORISTS

Announcing

Anti-Fume DE Paste

Anti-Fume DE Paste is an inhibitor for atmospheric gas fading of dyed acetate rayon.

As is well known, a number of the acetate dyes which have best light fastness fade when exposed to atmospheric gas fumes. The use of selected dyes from this group, protected by Anti-Fume DE Paste, makes possible the production of certain important shades on acetate rayon with better all-round fastness than has been possible up to now.

Anti-Fume DE Paste is substantively absorbed by the material, and its protective effect persists after washing and dry cleaning. This product is not a cure-all, but when properly used provides a valuable new tool for the acetate rayon dyer.

Commercial supplies of Anti-Fume DE Paste are being made available to the trade as rapidly as possible, and our technical personnel are cooperating with those interested in its use.

Du Pont Dyestuffs

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

DU PONT

DECERESOL* 1861 Softener is a durable type softener composed of surface active colloids and possessing a high degree of compatibility. At optimum concentrations it imparts superior softening with a soft, silky, but not raggy hand to woolens, cottons and rayons as well as to other yarns and threads. DECERESOL 1861 reduces bleeding of direct colors, decreases crocking of napthol colors and inhibits gas-fading tendencies of certain acetate colors. In warm water solutions, ordinary stirring produces good dispersion and stable suspension.

Write today for more detailed information as to general properties and methods of application.

Check These Special Properties of DECERESOL 1861

- Compatible with gums, starches, acids, solvents, and dilute alkalies (less than 1% NaOH); also with sulfonated oils and casein solutions in proper ratios.
- Excellent for yarns, fabrics and for knit goods where maximum elasticity is desired.
- Retains softening properties after repeated washing, dry cleaning of fabric.
- Will not discolor white goods when specified concentrations are applied.
- Yields greater resistance to hot-iron scorching than many cationic softeners.
- Will not develop odors on goods. White goods will not retain chlorine after bleaching.
- Possesses wetting ability, normally making use of additional wetting agent unnecessary.

AMONG CYANAMID PRODUCTS FOR THE TEXTILE INDUSTRY ARE... Penetrants, Softeners, Finishes, Sizing Compounds, DECERESOL* OT Wetting Agents, PARAMUL 115 Water Repellent, and other Specialties and Heavy Chemicals**

*Reg. U. S. Pat. Off. **Trade-Mark

American Cyanamid & Chemical Corporation

A UNIT OF AMERICAN CYANAMID COMPANY)

30 ROCKEFELLER PLAZA · NEW YORK 20, N. Y.

American Dyestuff Reporter, Vol. 35, No. 13, July 1, 1946. Published every other Monday. Copyright 1946, by Howes Publishing Co., One Madison Ave., New York 10, N. Y. Domestic subscription, $5.00; Canadian, $6.00; Foreign, $6.00. Entered as second-class matter, Nov. 6, 1919, at the New York, N. Y., Post Office, under the act of March 3, 1879.

LEVEL
NEW.... IMPROVED
Now its the four-way dye-house assistant
● A LEVELING AGENT
● A PENETRANT
● A STRIPPING AGENT FOR VAT COLORS
And now
● A WETTING-OUT AGENT
AMERICAN ANILINE PRODUCTS, INC.
50 Union Square, New York, N. Y. • Plant: Lock Haven, Pa. . . . . Branches: Boston, Mass.
Providence, R. I. • Philadelphia, Pa. • Charlotte, N. C. • Chicago, Ill. • Los Angeles, Cal.

For a cleaner textile world . . .

SULFRAMIN DT POWDER*

In a world that grows cleaner day by day, textile mills are depending more and more upon the chemical magic of Sulframin DT. For Sulframin DT is an unusually efficient detergent; and is very economical besides.

Chemically classified as an alkylaminosulphate, Sulframin DT functions effectively in almost every phase of boiling off and drying procedure. As an emulsifier and foaming agent it performs ideally; it dissolves readily and blossoms into rich suds even when diluted by ten thousand parts of water. Equally important, the efficiency of Sulframin DT isn't lessened when used in hard water.

Moreover, Sulframin DT is unaffected by the presence of lime and magnesium salts; it resists both acids and alkalies; and even after long storage, it does not deteriorate. Sulframin contains no soap; consequently rancidity and stains —so common when soap is used as the emulsifier —no longer present a textile problem. And in the dyeing industry concerned with processing rayons and acetates, the thorough dispersing qualities of Sulframin DT are utilized to particular advantage.

If you require more detailed information, phone or write!

ULTRA CHEMICAL WORKS

INCORPORATED

Paterson, New Jersey • Chicago, Illinois

OTHER ULTRA CHEMICAL PRODUCT DEVELOPMENTS: SULFRAMIN DT PASTE • SULFRAMIN DR PASTE
ULTRAMINE • DETERGOL • ALBUTEX • ALBUTINE • DERMASOL • ULTRA GLOSS B • DULLITE T

*Sulframin DT is an exclusive formula—U. S. PAT. PENDING • Sulframin DT Reg. U. S. Pat. Off.

For a cleaner textile world . . .

SULFRAMIN DT POWDER*

In a world that grows cleaner day by day, textile mills are depending more and more upon the chemical magic of Sulframin DT. For Sulframin DT is an unusually efficient detergent; and is very economical besides.

Chemically classified as an alkylaminosulphate, Sulframin DT functions effectively in almost every phase of boiling off and drying procedure. As an emulsifier and foaming agent it performs ideally; it dissolves readily and blossoms into rich suds even when diluted by ten thousand parts of water. Equally important, the efficiency of Sulframin DT isn't lessened when used in hard water.

Moreover, Sulframin DT is unaffected by the presence of lime and magnesium salts; it resists both acids and alkalies; and even after long storage, it does not deteriorate. Sulframin contains no soap; consequently rancidity and stains —so common when soap is used as the emulsifier —no longer present a textile problem. And in the dyeing industry concerned with processing rayons and acetates, the thorough dispersing qualities of Sulframin DT are utilized to particular advantage.

If you require more detailed information, phone or write!

ULTRA CHEMICAL WORKS

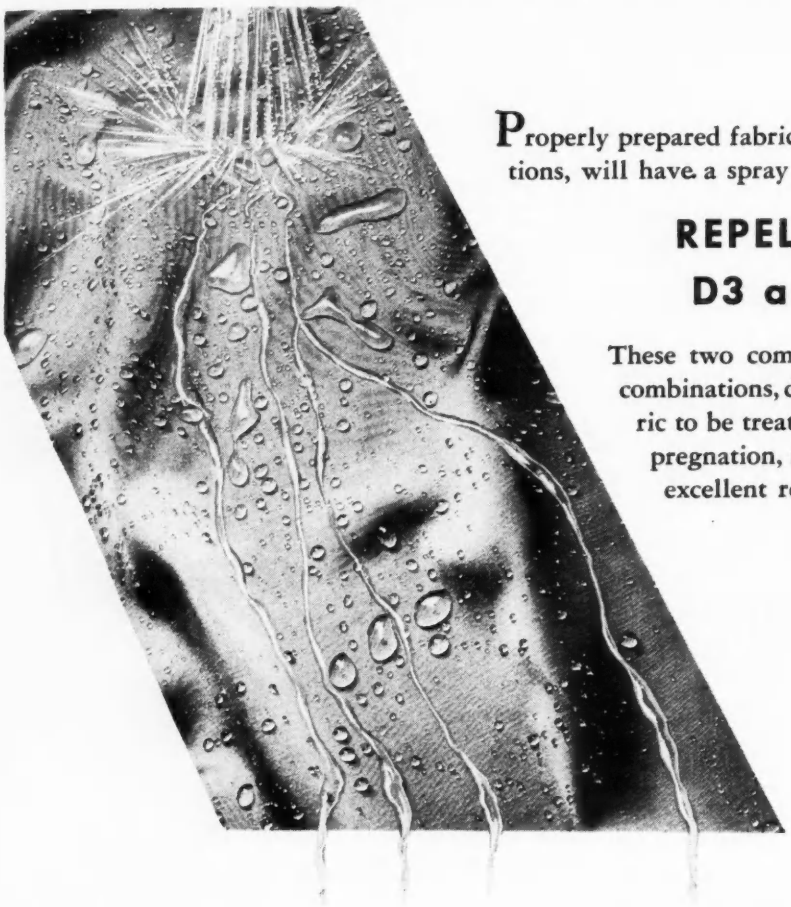
INCORPORATED

Paterson, New Jersey • Chicago, Illinois

OTHER ULTRA CHEMICAL PRODUCT DEVELOPMENTS: SULFRAMIN DT PASTE • SULFRAMIN DR PASTE
ULTRAMINE • DETERGOL • ALBUTEX • ALBUTINE • DERMASOL • ULTRA GLOSS B • DULLITE T

*Sulframin DT is an exclusive formula—U. S. PAT. PENDING * Sulframin DT Reg. U. S. Pat. Off.

SPRAY RATING 100



Properly prepared fabrics, treated according to directions, will have a spray rating of 100 when you use

REPEL-O-TEX D3 and D4*

These two compounds are used in varying combinations, depending on the fibre and fabric to be treated. A full dip with good impregnation, as from a deep box, will give excellent results in jig, pad or quetsch.

*Registered U. S. Patent Office

Durable

Repel-O-Tex-treated fabrics have durable water repellency. After three washings (at 100°F.) with 0.1% soap and 0.05% soda ash, or three dry cleanings (U. S. Army Specifications), the spray rating will still be 70 or better.

No Baking or After Treatments

Finished fabrics require no baking or after treatments subsequent to jigging, padding or quetsching in Repel-O-Tex. They are dried and handled in the normal manner.

For Cotton, Rayon and Other Fabrics

Repel-O-Tex D3 and D4 can be used for durable and effective water repellency on cotton, viscose, acetate and all other textiles. Completely dependable results will be consistently obtained when the fabric is properly prepared before treatment and the specific use-formulae for these compounds are carefully followed.

* * *

Investigate this superior water repellent. It's stain and perspiration resistant, too!

ONYX OIL & CHEMICAL COMPANY

JERSEY CITY 2, N. J.

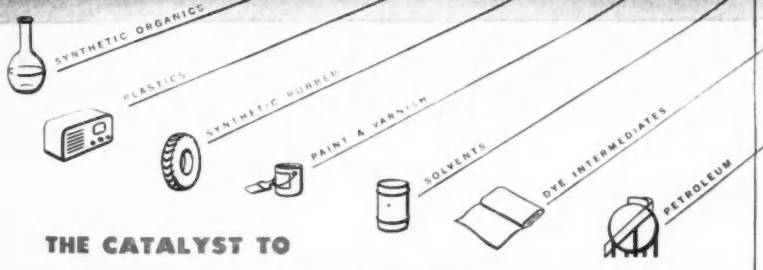
CHICAGO • PROVIDENCE • CHARLOTTE

In Canada: ONYX OIL & CHEMICAL CO., LTD.—MONTREAL, TORONTO, ST. JOHNS, QUE.

For Export: ONYX INTERNATIONAL, JERSEY CITY 2, N. J.

onyx CHEMICALS FOR DYEING AND FINISHING

General Chemical Fluorine Research Presents...



THE CATALYST TO CHART NEW COURSES FOR AMERICAN INDUSTRY

Boron Fluoride Etherate . . . valuable catalytic chemical of wide ranging potentialities for American Industry!

This new liquid fluorine compound has a multitude of uses. Technical literature—filling volumes—contains extensive data on the reactions catalyzed by BF_3 as well as by its complexes with other organic molecules. Repeated reference is made to its superiority to other catalysts since reactions are moderated and fewer undesirable by-products result.

Outlined at right are some of the principal applications for BF_3 as a catalyst. Perhaps they indicate ways in which you can utilize a chemical of these characteristics in your development or production program.

Boron Fluoride Etherate is commercially available in drums. For full information, contact General Chemical Company, Fluorine Division, 40 Rector Street, New York 6, N. Y. When writing, if you outline your proposed application for this new catalyst, the tethnical experts of our Fluorine Division can work with you toward an early solution of your problem.

Physical Properties

Formula: C_2H_5 > O.BF_3 (C_2H_5)

Mol. Wt.	141.9
Melting Pt.	Less than —60°C
Boiling Pt.	125°C
Spec. Gr.	1.14 at 25°C
%BF_3	47.8% min.

Some of the Principal Reactions Catalyzed by BF_3

1. Polymerization of unsaturated compounds such as olefins, diolefins, vinyl ethers, fatty oils, and terpenes. The products may be solid polymers useful as plastics or liquids as in the bodying of drying oils for paints and varnishes.

2. Condensation of aromatic nuclei with olefins and diolefins, paraffins, and olefins, and aromatic nuclei or olefins with acids.

3. As a cyclizing agent for rubber.

4. As an esterification catalyst.

5. As a catalyst in the synthesis of aliphatic acids from alcohols and carbon monoxide.

6. As a promoter and dehydrating agent in the sulfonation and nitration of aromatic compounds.

GENERAL CHEMICAL COMPANY
40 RECTOR STREET, NEW YORK 6, N. Y.

Sales and Technical Service Offices: Atlanta • Baltimore • Birmingham (Ala.) Boston • Bridgeport (Conn.) • Buffalo • Charlotte (N. C.) • Chicago Cleveland • Denver • Detroit • Houston • Kansas City • Los Angeles Minneapolis • New York • Philadelphia • Pittsburgh • Providence (R. I.) San Francisco • Seattle • St. Louis • Utica (N. Y.) • Wenatchee Yakima (Wash.)

In Wisconsin: General Chemical Wisconsin Corporation, Milwaukee, Wis.
In Canada: The Nichols Chemical Company, Limited
Montreal • Toronto • Vancouver

BASIC CHEMICALS
GENERAL CHEMICAL COMPANY
FOR AMERICAN INDUSTRY

PERKINS
HOLYOKE

TRADE MARK REG.

For the Textile Industry

Cotton Rolls
Cotton and Wool Rolls
Combination Rolls
Husk Rolls
Paper Rolls
Embossing Rolls
Friction Calenders
Schreiner Calenders
Chasing Calenders
Rolling Calenders

Silk Calenders
Embossing Calenders
Cloth Pilers
Drying Machines
Dye Jigs
Mangles
Padders
Squeezers
Washers
Winders

Mullen Testers

EASTONE RED R

For Plain or Dischargeable Dyeing of Acetate Rayon

EASTONE RED R is a highly soluble product suitable for dyeing medium bright shades of red on cellulose acetate rayon. Over a wide temperature range, level shades of substantially the same depth are produced in either jig or box dyeing.

Eastone Red R is being used extensively either as a self-shade or in combination with other dyestuffs which have drawing and absorption power adaptable to the type of dyeing work that is employed. Its excellent fastness to sublimation adapts it to application printing. Eastone Red R is especially recommended as the red component in shades which are to be used for discharge printing of acetate rayon fabrics.

This dye is one of an expanding line of Eastman Acetate Dyestuffs, which are available in a wide color range. For information concerning these dyestuffs, address your request to TENNESSEE EASTMAN CORPORATION (Subsidiary of Eastman Kodak Company), KINGSPORT, TENNESSEE.

Eastman

ACETATE DYESTUFFS

You know detergents
–BUT DO YOU KNOW ORATOL?

• Oratol L-48 is well worth meeting! This Sulphonated Hydroxy Amide paste has unusual detergent and emulsifying properties and gives a heavy, continuous foam—points of real interest in any print wash, boil-off, or other dyehouse job.

You can use Oratol without hesitation in either slightly acid or alkaline solutions. It is unaffected by hard water or metallic salts, prevents the formation of lime soaps. It may be used alone as a full boil-off or, in lesser amounts, as a wash for printed fabrics. When used in conjunction with soap, it increases the stability of the soap and prevents the formation of soap curds with lime.

OTHER MEMBERS OF OUR FAMILY OF SYNTHETIC DETERGENTS:

ORATOL S POWDER
(Sulphated Amide)

SELLOGEN A S CONC
(Aryl alkyl sulfonate)

SELLOGEN C
(Higher Alcohol-Ester Compound)

EMULSIFIERS
L-32, L-34, L-45
(Non-ionic higher fatty acid ester)

WOLF BRAND PRODUCTS

JACQUES WOLF & CO.
Chemicals **PASSAIC, N. J.**
OTHER PLANTS: CARLSTADT, N. J. • LOS ANGELES, CALIF.
WAREHOUSES: Providence, R. I., Philadelphia, Pa., Utica, N. Y., Chicago, Ill., Greenville, S. C., Chattanooga, Knoxville, Tenn.

CHEMICAL BALANCE

FOR MORE THAN 50 YEARS Mathieson has been known as a leading producer of heavy chemicals, the basic raw materials of industry . . . caustic soda, soda ash, bicarbonate of soda, ammonia, liquid chlorine. But meanwhile, Mathieson has been diversifying . . . has been building an ever-growing family of chemical specialties.

- **There's Sodium Chlorite, for instance, a remarkable bleaching and oxidizing agent (an exclusive development of the Mathieson research staff) . . .**
- **There's Chlorine Dioxide, co-product of Sodium Chlorite, which is performing such wonders removing tastes and odors from municipal water supplies . . .**
- **There's Sodium Methylate, used in the preparation of sulfa drugs, barbiturates, vitamins, and organic intermediates . . .**
- **And there's Dry Ice, the modern low-temperature refrigerant . . .**
- **There's HTH, a high-test calcium hypochlorite widely used for laundry bleaching and water treatment . . .**
- **Lo-Bax and HTH-15, chlorine sanitizing agents for dairy and poultry use . . .**
- **Super-Mafos briquet cleanser for dishwashing . . .**
- **Super-Nufos briquet cleanser for dairy can washing . . .**
- **Purite for refining and desulphurizing iron . . .**
- **PH-Plus for alkalinity control in water treatment . . .**
- **Chromotex for plant cleaning of rugs and carpets . . .**
- **Neutrotone for "location" cleaning of carpeting.**

Each of these chemical specialties is outstanding in its own field. As a group they form an ideal balance for the dependable heavy chemicals on which Mathieson's reputation for quality was first established.

Mathieson
CHEMICALS

THE MATHIESON ALKALI WORKS (Inc.)
60 E. 42nd St., New York 17, N. Y.

A NEW MULTI-PURPOSE SYNTHETIC AUXILIARY

REPCOLENE, a neutral blend of fatty acid esters and aromatic sulphonates, is a clear, free flowing, non-jelling liquid. REPCOLENE is an effective wetting and scouring agent. REPCOLENE also acts as an excellent dye assistant and leveling agent. REPCOLENE is extremely stable, and its activity is not affected by acids, alkalies, lime, or the salts, usually found in hard water.

REFINED PRODUCTS COMPANY
Lyndhurst • New Jersey

*** Manufacturers of PERMA-CIDE, the approved, outstanding, mildew-proofing agent**

Southern Representative: DYER S. MOSS, 1301 Liberty Life Bldg., Charlotte, North Carolina

New England Representatives: E. L. LEGG, P. O. Box 597, Providence, R. I.
CLARENCE E. MOSS, 19 Wilson Ave., Rumford (16) R. I.

Canadian Selling Agents: Berkeley Products Canada, Ltd., 41 Hillcrest Avenue, St. Catharines, Ontario, Canada
Exporting Agent: Chem-Col Company, 82 Wall St., New York City

SANDOZ PRESENTS *The color achievement of the month*

Young in Spirit BY LEININGER

Here are socks you'd expect to see on men who are young in spirit . . . who like the outdoors, who go places and do things and kick up their heels now and then.

Helping to give Wm. G. Leininger Knitting Co.'s Sox-Cess brand the sales-making life and sparkle that you can recognize in this color reproduction are dyes by Sandoz, supplier to many of the leaders in textiles.

A consistent policy of *thinking ahead with textiles* means that you can depend upon Sandoz to develop colors that will accurately, efficiently and economically reproduce the ideas of the progressive designer. For example: the Azoform and Viscoform colors which have such good fastness to washing on Cotton or Rayon; the Xylene Milling and Sulfonine colors for Wool and Worsted going into knitting yarns of all types; and the newer group of Brilliant Alizarine and Alizarine Milling colors of outstanding fastness to both mill and wearing requirements.

For acid, chrome or direct dyes . . . or auxiliary chemicals . . . for both natural and synthetic fibres . . . you'll find the "color achievements" you see in these Sandoz advertisements a reliable guide to your needs.

Sandoz application laboratories are at your service in New York, Boston, Philadelphia, Los Angeles, Charlotte and Toronto where stocks in wide range are carried. Other branches are located in Chicago, Paterson and Providence.

SANDOZ CHEMICAL WORKS, INC., 61 VAN DAM STREET, NEW YORK 13, N. Y.

SANDOZ *thinks ahead with textiles*

SANDOZ

Manufacturers of

ANILINE -- ALIZARINE -- CHROME

and

ACETATE DYESTUFFS

FUGITIVE WOOL TINTS
FINE ORGANIC PIGMENTS
TANNIC ACID and CHEMICALS

Our laboratories are always at your service

ZINSSER & COMPANY, Inc.
ESTABLISHED 1897
Manufacturing Chemists
HASTINGS-ON-HUDSON NEW YORK

RAPIDASE

for de-sizing cottons, rayons and mixed goods

•

Assures rapid, dependable de-sizing.

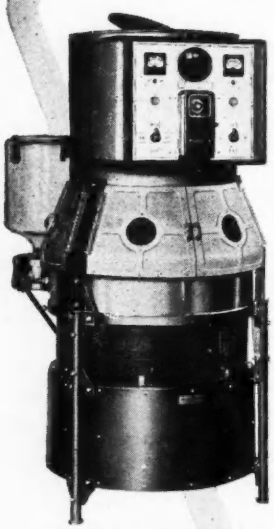
•

Our technical staff always at your service.

•

WALLERSTEIN COMPANY, INC.
180 MADISON AVENUE • NEW YORK 16

FADE-OMETER



• For over twenty-five years the yardstick of the Textile and Dyestuff industry for determining the light fastness of materials.
An indispensible machine for proving the light fastness of dyestuff and fabrics. Fade-Ometer tests are required by many government specifications.
Specimens are rotated around the Atlas Enclosed Violet Arc—the closest approach to natural sunlight. Temperature and humidity regulated—fully automatic in operation—perfectly safe to operate unattended over night.

ATLAS ELECTRIC DEVICES CO., 361 W. Superior St., Chicago 10, Ill.

ATLAS-OMETERS
Weather-Ometer ★ Fade-Ometer ★ Launder-Ometer

50 YEARS

OF CONTINUOUS SERVICE AS A MANUFACTURER OF INDUSTRIAL SOAP FLAKES, POWDERED SOAPS, BULK SOAPS AND PRODUCER OF CRUDE GLYCERINE.

1896 NAMICO 1946

T.M. REG. U.S. PAT. OFF.

NATIONAL MILLING & CHEMICAL COMPANY

4601 NIXON STREET, PHILADELPHIA 27, PENNA.

QUALITY RICHMOND PRODUCTS

Less Handling with

AFTER CHLOR

Eliminates 3 to 5 Handlings

Bleach with
Hypochlorite
Rinse and Use

AFTER CHLOR

THAT'S ALL!

Write for FREE Sample

RICHMOND OIL, SOAP & CHEMICAL CO., Inc.

1041-43 FRANKFORD AVE., PHILADELPHIA 25, PA.

LeaTex

The name that means
leadership in

CHEMICAL SPECIALTIES

for the
TEXTILE INDUSTRY

"Always Reliable"

LEATEX CHEMICAL COMPANY

2722 N. HANCOCK ST., PHILADELPHIA, PA.

IF deliveries are not coming through as fast as you would like to have them, we would like to borrow the artist's idea and say, "Don't shoot, we're doing the best we can." We are trying our best to furnish the same prompt delivery service that has been available to SOLVAY customers for years, but in spite of all our efforts, current demands have kept ahead of production. We appreciate the friendly cooperation of loyal SOLVAY customers and we hope that it will not be long before apologies for tardy deliveries will no longer be necessary.

SOLVAY SALES CORPORATION

Alkalies and Chemical Products Manufactured by The Solvay Process Company

40 Rector Street **New York 6, N. Y.**

SOLVAY
TRADE MARK REG. U. S. PAT. OFF.

Soda Ash
Caustic Soda
Specialty Cleansers
Chlorine Products
Ammonium & Potassium Products
Calcium Chloride

QUALITY **RICHMOND** PRODUCTS

Something Really NEW for WOOL and WORSTED

Scours either neutral or acid
Contains NO Soap
Does not break in hard water

•

SCOURCLEAN X

The newest idea for
WOOL and WORSTED

•

Send for FREE Sample

RICHMOND OIL, SOAP & CHEMICAL CO., Inc.
1041-43 FRANKFORD AVE., PHILADELPHIA 25, PA

BURKOL

SYNTHETIC DETERGENT

BURKOL is a true detergent. That is, it possesses scouring and cleansing power to a marked degree, whereas the majority of the so-called synthetic organic detergents are primarily wetting agents.

BURKOL is economical to use, because it is low in cost and but a little is required for effective results. It is well suited for scouring and boiling off all types of textiles, including raw stock, yarns, hosiery, and fabrics. **BURKOL** may be applied in hard or soft water.

Goods scoured with **BURKOL** acquire a pleasing soft finish, which is well-retained through subsequent dyeing operations, so that usually no further finishing is required.

BURKART-SCHIER CHEMICAL CO.
CHATTANOOGA, TENNESSEE
MANUFACTURING CHEMISTS FOR THE TEXTILE INDUSTRY

TEXODORS ASSURE POSITIVE RELIEF FROM FINISHING ODORS

Consumer preference for *your* textile products depends to a vast degree upon the right product odor... and new problems in odor control are constantly being created by the use of new textile-finishing materials, such as water repellents, resin coatings and binders.

The disagreeable odors inherent in these materials can be overcome easily and economically by

TEXODORS*...

Givaudan's line of ready-to-use industrial deodorants and reodorants.

Furthermore, Givaudan is equipped to develop new TEXODORS to meet your special needs ... to mask disagreeable residual odors or to obtain specific odor effects.

TEXODORS satisfy all technical requirements for tenacity of color... heat resistance... freedom from discoloration...low cost...economy of application and other problems. May we send you samples, prices and further information?

**Texodor Reg. U.S. Pat. Off.*

"BUY WISELY . . . BUY GIVAUDAN"

Givaudan-Delawanna INC.

Industrial Products Division · 330 WEST 42nd STREET · NEW YORK 18, N. Y.

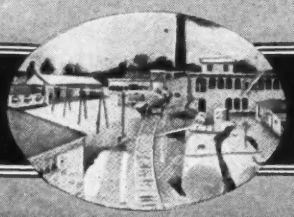
"WAPACO" PRODUCTS Serve the Textile Industry

WATSON-PARK CO. Wapaco Leads BOSTON, MASS.

DYESTUFFS
CHEMICALS
TEXTILE SOAPS
TEXTILE OILS
STRIPPING COMPOUNDS

TAR REMOVER HET

- A self-emulsifying product of high concentration.
- Removes tar and paint from piece goods COMPLETELY in the wet finishing process.



Factory
LOWELL JCT.
MASS.

WATSON-PARK COMPANY

261 FRANKLIN STREET · BOSTON, MASS.

A message to suppliers of the Textile Wet Processing Industry re:

1946 YEAR BOOK
of the
American Association of Textile Chemists and Colorists

Work on the preparation of the 1946 Year Book of the American Association of Textile Chemists and Colorists is now under way.

A great majority of the approximately 800 pages which comprise this volume are devoted to technical information such as standard testing methods for various fastness requirements, lists of dyestuffs, textile chemical specialties, etc. Because of this fact the book is a standard reference work used almost daily in practically every textile laboratory and dyehouse in the country.

An advertising message in its pages will reach those individuals chiefly concerned with the purchasing of textile wet processing requirements. This message will reach them, not only once, but constantly throughout the year.

Advertising rates, for an anticipated circulation of over 5500, are only $125.00 per page and $75.00 per half page.

The Howes Publishing Company acts as agents for the Association in the publication of the volume but has no share in its finances. Inquiries regarding advertising space should be directed to them at:

One Madison Avenue, New York 10, N. Y.

•CLASSIFIED ADVERTISEMENTS•

CONFIDENTIAL EMPLOYMENT SERVICE — We invite correspondence (confidential) with Dyers, Chemists, Colorists, Superintendents, Master Mechanics, Office Managers, and others seeking positions and with employers seeking high-grade men to fill vacancies or to make replacements. Charles P. Raymond Service, Inc., 294 Washington St., Boston, Mass. Over 45 years in business.

POSITION WANTED: Assistant dyer or textile colorist; 13 years mill and laboratory experience in wool and rayon top and raw stock dye plant. 34 years old, married and have 2 children. Prefer southern New England. Write Box 872.

POSITION WANTED: Research-development engineer. Sixteen years in responsible positions. Extensive experience in synthetic resins and plastics, applications as well as manufacture; textile finishes; synthetic fibers; soaps, oils, waxes; adhesives; emulsions. Broad education. Creative, operative. Atlantic seaboard preferred. Box 882.

POSITION WANTED: Superintendent of dyeing. Eighteen years' experience. Employed at present. Age, 38, married. Box 884.

POSITION WANTED: Superintendent of Dyeing, wishes to make change in New England area. Textile school graduate with 19 years laboratory and mill experience. Supervisor of package and skein dyeing for over 10 years, working with cotton, wool, aralac, spun and filament rayons. Write Box 887.

POSITION WANTED: Textile Chemist, 48, single with 23 years experience in cotton and rayon piece goods finishing; college graduate, capable of assuming charge of laboratory. Philadelphia area preferred. Write Box 888.

POSITION WANTED: Textile chemist and colorist; over 17 years experience in textile laboratory work. Thoroughly familiar with printing, dyeing and padding of all types of cloth. Also some resin experience. Desires position in technical sales or research. Capable of directing laboratory. Write Box 889.

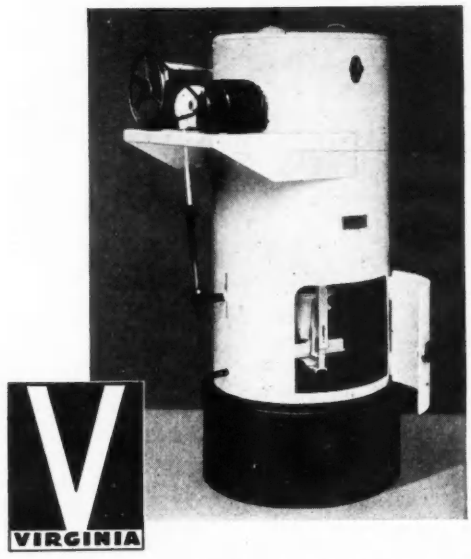
WANTED: Assistant Dyer experienced on Acetate and Vat Dyes. State full qualifications. Write Box 890.

WANTED: Long established heavy chemical firm desires a salesman for Rhode Island experienced in this or allied fields. Would consider buyer or chemist with sufficient background. Answer giving full details box 891.

WANTED: Chemist for dyestuff laboratory. Must be thoroughly familiar with application work, dyeing and screen printing, on all fabrics. State experience and salary. Our employees know of this ad. Write Box 892.

WANTED: Textile Chemist with experience in finishing and dyeing for research and development work with chemical company located in the Niagara Frontier area. Write Box 894.

Now YOU CAN SAVE *"HYDRO" AND* $ $ $ $ WITH THE "HYDROMISER"



Progressive finishers who are using this new VIRGINIA "extra" report a 10 to 15 percent Hydro saving and a significant reduction of rejects in continuous dye operation. The HYDROMISER automatically feeds Sodium Hydrosulphite to the dye bath, insuring uniformity through accurately controlled flow—1 pound to 200 pounds per hour. If your dye process is continuous, you should investigate. Mail the coupon for complete details on the HYDROMISER.

VIRGINIA
SMELTING COMPANY
WEST NORFOLK, VIRGINIA
NEW YORK • PHILADELPHIA • BOSTON
CHARLOTTE • DETROIT

Virginia Smelting Co.,
West Norfolk, Va.

Gentlemen:

Please send information on saving Sodium Hydrosulfite with the HYDROMISER.

Name_____ Position_____

Company_____

City_____ Zone_____ State_____

10 PRODUCTS of Proven Dependability

WHICH SHOULD WARRANT ★ YOUR ATTENTION ★

***AQUAROL :** A water repellent for processing woolen, cotton and rayon fabrics, also produces excellent results in splashproofing or finishing all types of hosiery.

***PARAMINE S :** A cation active softener for processing cotton and rayon cloth to obtain a soft, smooth, pleasing finish.

***ALGEPON S :** An assistant in dyeing vat colors to prevent premature oxidation of the reduced bath and eliminate uneven dyeings.

***ALGEPON V A :** Assistant for stripping vat colors—complete reduction of color in stripping bath providing lighter bottom for redyeing.

***PARAPON S A :** A highly efficient leveler and softener for dyeing and finishing all types of yarn, cloth and hosiery to produce a uniform dyeing and a soft full hand.

***ARIPEL F S :** Finish and gas inhibitor for processing dyed acetate rayon—produces a soft full feeling finish and prevents gas fading of the color.

***LANITOL F :** A synthetic detergent possessing exceptional scouring and washing properties for processing wool, cotton, rayon or nylon.

***CULOFIX :** Used as an after treatment in last rinse to prevent bleeding of direct dyed cotton or rayon in water.

***DIAZONOL A C :** For boiling out cotton cloth in pressure or open kiers to produce greater absorbency and cleaner material. Excellent for preboiling knitted cloth in preparation for chlorine bleach. Also used with good results for boiling out cotton or rayon cloth on the jig.

***TETRANOL 1638 :** A rapid wetting and penetrating agent. Active in acid, alkaline and salt solutions and not affected by hard water, may be used in all types of dyeing operations to insure positive penetration of color and a uniform and solid shade.

And a Complete Line of Oils, Chemicals, Softeners and Finishes For Wet Processing All Textile Fibres

*Reg. U.S. Pat. Off.

ARKANSAS CO. Inc.

Newark, New Jersey

ESTABLISHED OVER 40 YEARS

INDEX TO ADVERTISERS

Alrose Chemical Co.
Althouse Chemical Co.
Amalgamated Chemical Corp.
American Aniline Products, Inc.
American Cyanamid & Chemical Corp. — Second Cover
American Dyewood Company
American Viscose Corp.
Ansul Chemical Company
Aqua-Sec Corp.
Aridye Corp.
Arkansas Company, Inc.
Arnold, Hoffman & Co., Inc.
Atlantic Chemical Co.
Atlas Electric Devices Co.

Becco Sales Corp.
Bick & Co., Inc.
Blickman Co., S.
Borne Scrymser Co.
Burkart-Schier Chemical Co.
Butterworth Sons Co., H. W.

Calco Chemical Division, American Cyanamid Co.
Calgon, Inc.
Campbell & Co., Inc., John
Carbic Color & Chemical Co., Inc.
Carbide & Carbon Chemicals Corp.
Carbomatic Corp.
Ciba Company, Inc.
Colgate-Palmolive-Peet Co.
Commonwealth Color & Chemical Co.

Drew & Co., E. F.
DuPont de Nemours & Co., E. I.
Dyestuffs Division — Front Cover
Fine Chemicals Div.

Electro Metallurgical Co.
Emery Industries, Inc.
Exact Weight Scale Co.

Fancourt & Co., W. F.

Gardinol Corp.
Geigy Company, Inc.
General Chemical Co.
General Dyestuff Corp.
Givaudan-Delawanna, Inc.
Glycerine Producers Association

Hart Products Corp.
Hercules Powder Co.
Hooker Electrochemical Co.
Houghton & Co., E. F.

Industrial Rayon Corp.
International Salt Co., Inc.

Johnson & Son, Inc., S. C.

Kali Manufacturing Co.
Kearny Mfg. Co.
Kelco Co.

Laurel Soap Mfg. Co., Inc.
Leatex Chemical Co.
Leeds & Northrop Co.

Macbeth Corp.
Maher Color & Chemical Co.
Mathieson Alkali Works, Inc.
Monsanto Chemical Co.

National Aniline Division, Allied Chemical & Dye Corp.
National Carbon Co.
National Milling & Chemical Co.
National Oil Products Co.
National Starch Products, Inc.
Naylee Chemical Co.
Nuodex Products Co., Inc. — Third Cover
Nyanza Color & Chemical Co.

Onyx Oil & Chemical Co.

Pabst Sales Company
Perkins & Sons, Inc., B. F.
Philadelphia Quartz Co.
Procter & Gamble

Refined Products Co.
Richmond Oil, Soap & Chemical Co., Inc.
Riverside & Dan River Cotton Mills, Inc.
Rohm & Haas Co.
Royce Chemical Co. — Back Cover
Rumford Chemical Works

Sandoz Chemical Works
Scholler Bros., Inc.
Sherwin-Williams Co.
Smith-Drum & Co.
Socony-Vacuum Oil Co., Inc.
Solvay Sales Corp.
Sonneborn Sons, Inc. L.
Standard Brands, Inc.
Standard Chemical Products, Inc.
Stein, Hall & Co., Inc.

Tennessee Eastman Corp.

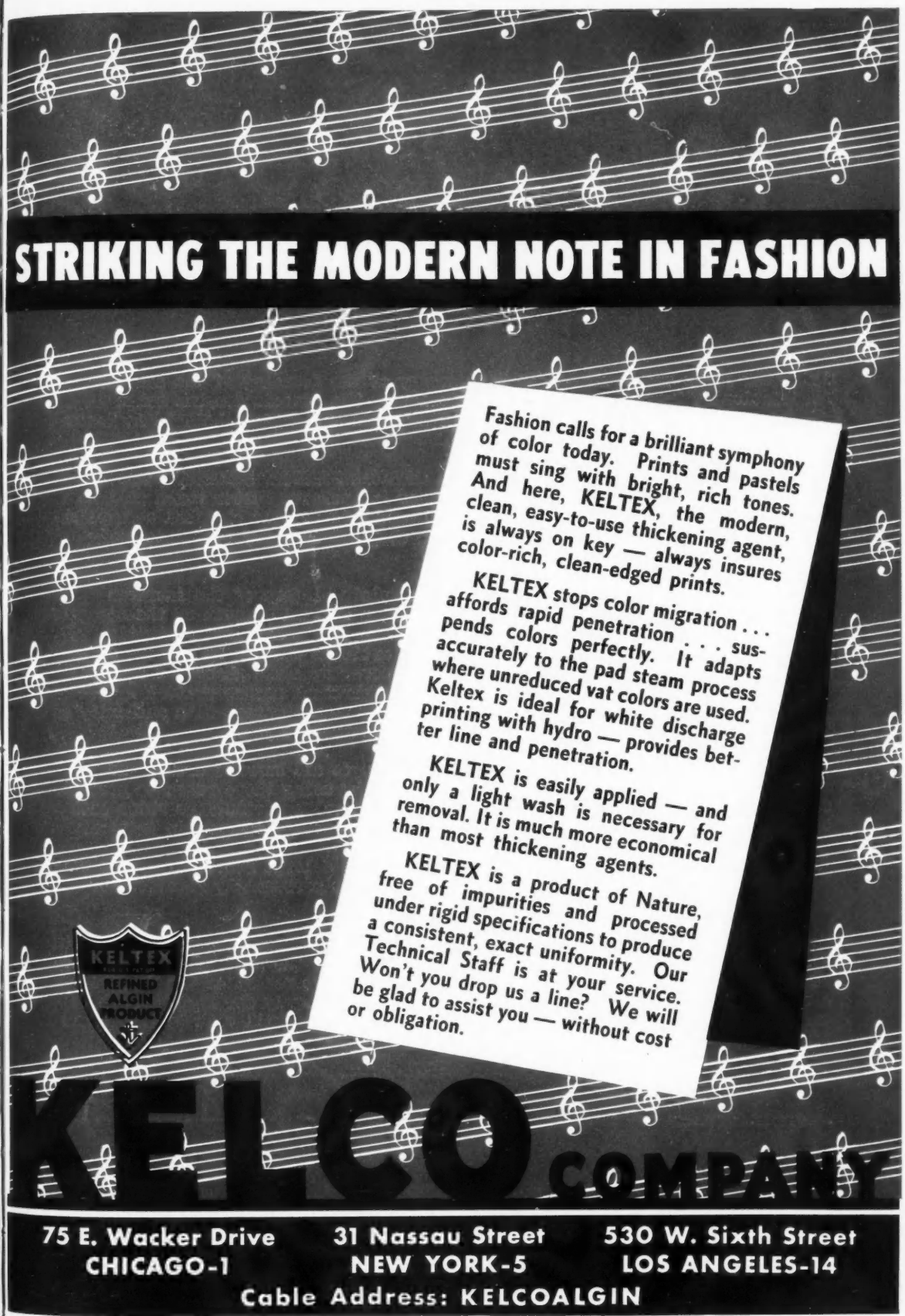
Ultra Chemical Works
Union Carbide & Carbon Corp.

Van Vlaanderen Machine Co.
Virginia Smelting Co.

Wallerstein Co., Inc.
Watson-Park Company
Wolf & Co., Jacques

Young Aniline Works
Young Co., J. S.

Zinsser & Co., Inc.
Zurn Co., O. F.


STRIKING THE MODERN NOTE IN FASHION
Fashion calls for a brilliant symphony of color today. Prints and pastels must sing with bright, rich tones. And here, KELTEX, the modern, clean, easy-to-use thickening agent, is always on key — always insures color-rich, clean-edged prints.
KELTEX stops color migration . . . affords rapid penetration . . . suspends colors perfectly. It adapts accurately to the pad steam process where unreduced vat colors are used. Keltex is ideal for white discharge printing with hydro — provides better line and penetration.
KELTEX is easily applied — and only a light wash is necessary for removal. It is much more economical than most thickening agents.
KELTEX is a product of Nature, free of impurities and processed under rigid specifications to produce a consistent, exact uniformity. Our Technical Staff is at your service. Won't you drop us a line? We will be glad to assist you — without cost or obligation.
KELTEX
REFINED ALGIN PRODUCT
KELCO COMPANY
75 E. Wacker Drive CHICAGO-1
31 Nassau Street NEW YORK-5
530 W. Sixth Street LOS ANGELES-14
Cable Address: KELCOALGIN

HOWES PUBLISHING COMPANY

A. P. HOWES, PRESIDENT

Metropolitan Tower, New York 10, N.Y.

This year marks the Twenty-fifth Anniversary of the founding of the American Association of Textile Chemists and Colorists. The Association has taken cognizance of this fact by designating its annual meeting--to be held in Boston in mid-December--as its Silver Jubilee.

In cooperation with the Association, the AMERICAN DYESTUFF REPORTER plans to produce at the time of this meeting a Silver Anniversary Number which will be a complete and permanent record of the achievement of textile chemical accomplishments since the American synthetic organic chemical industry came into being with World War I.

The text pages of this issue will carry a complete history of the American Association of Textile Chemists and Colorists, a factual account of the struggle for tariff protection which made the development of the American synthetic organic chemical industry possible, numerous articles written by persons designated by the A.A.T.C.C. as best qualified to cover specific phases of chemical accomplishment, and further articles of a more personal nature written by individuals whose positions and contacts qualify them to speak with authority on textile chemical affairs throughout the last twenty-five years.

The advertising pages of this issue will be open to all manufacturers, and we feel confident that they will cooperate with us by using these pages to present in permanent record form an account of the individual contributions which each of them has made toward the development of textile wet-processing in America.

In addition to the REPORTER's regular circulation, a large number of copies will be bound in cloth covers, so that the volume may be permanently retained for reference in libraries and offices.

We shall approach each recipient of this letter in the near future with requests for advertising cooperation, but if we are to produce the kind of a volume which we visualize and which will be a creditable, permanent record of the achievements of all factors in our industry, it is none too early for each concern to give serious thought to the type of material which they will wish to include in this issue.

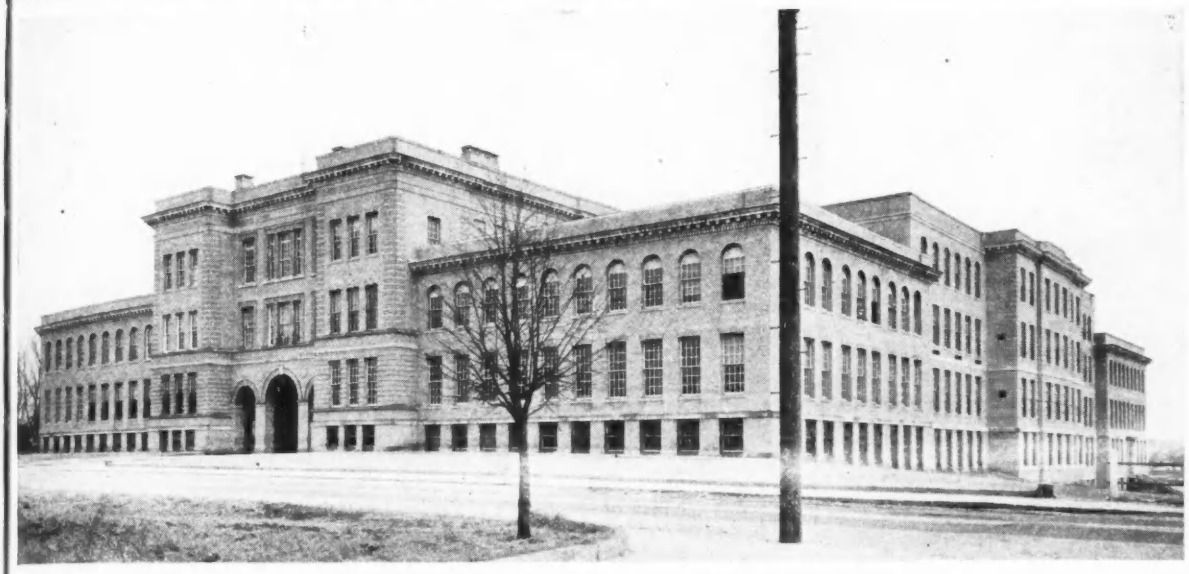
Faithfully yours,

A. P. Howes

APH:s

Proceedings of the
American Association of Textile Chemists and Colorists

JULY 1, 1946



View of Lowell Textile Institute as seen from Moody Street.

A. A. T. C. C. LABORATORIES
at the Lowell Textile Institute

BY a very fortunate arrangement, the American Association of Textile Chemists and Colorists, through the courtesy of the Lowell Textile Institute and its trustees, has been provided with considerable space at the school in Lowell, Massachusetts, for the operation of laboratories and offices.

At the present time this space is being used by the chairman of the research committee, the director of research, a secretary, one research associate, two research assistants, and one laboratory assistant. It is planned, as soon as organization has proceeded far enough, to add other research workers to the staff.

In order to acquaint the members with the facilities which are available at Lowell, there follows an introduction to the personnel, a brief description of the various laboratories and other space available, and a number of photographs.

RESEARCH STAFF

Director of Research

Dr. Harold W. Stiegler is the first full time Director of Research of the A.A.T.C.C. having been appointed to this post in December, 1945. He is charged with general supervision of all research work both at Lowell and at other institutions.

Dr. Stiegler is a graduate of Lowell Textile Institute and later took post-graduate work at the Massachusetts Institute of Technology and received his doctor's degree at Northwestern University. He has had teaching experience both at the Lowell Textile Institute and Northwestern University.

During World War I he served in the Chemical Warfare Service and worked with W. Lee Lewis during the discovery and development of "Lewisite," the American mustard gas. After the war he became assistant to Dr. Lewis, head of the chemistry department at Northwestern University and worked on further researches on Lewisite and its derivatives. He remained in the Officers Reserve, Chemical Warfare Service, until World War II, when he was called to active duty in 1942 in the Office of the Chief, Washington, D. C., as Chief, Protective Division, Technical Command.

Dr. Harold W. Stiegler
Director of Research

He has had a wide experience in both chemical and textile industries in research and administrative capacities. He specialized in organic chemistry, dyes and textile chemicals, finishes, auxiliaries and textile processing. He has been on the research staffs of National Aniline Division, Allied Chemical & Dye Corp., Rohm and Haas Co., Cheney Brothers, and for six years was head of the textile chemicals division, American Cyanamid Co., Research and Development Laboratories.

Research Associate

G. Robert Thompson, Research Associate of the A.A.T.C.C., is a graduate of Lowell Textile Institute. He has had experience as a textile chemist with the

Dr. Harold C. Chapin
Secretary of the A.A.T.C.C.

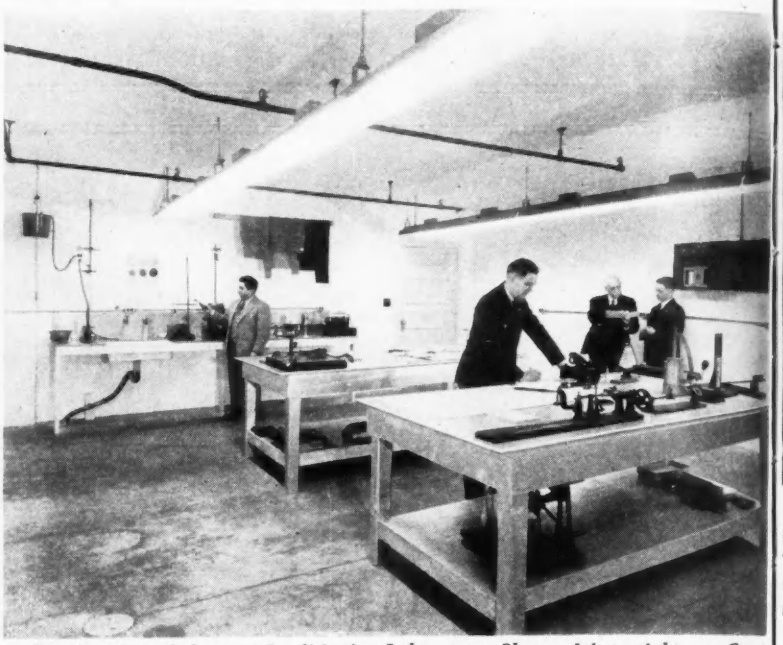
Mrs. Holt, Assistant to Dr. Chapin

U. S. Finishing Co., and as a research chemist with Albi Chemical Co., Remington Arms and Sylvania Electric Products, Inc. He has been with the A.A.T.C.C. since 1944 and his most recent work has been in a supervisory capacity.

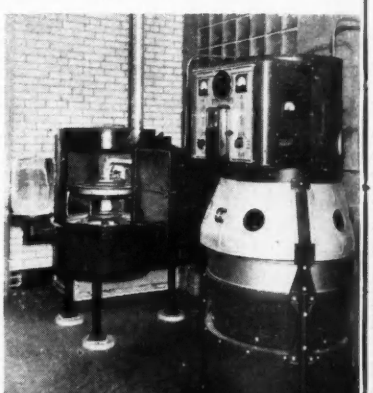
Research Assistants

George J. Mandikos, research assistant of the A.A.T.C.C., received both his bachelor's and master's degrees at Lowell Textile Institute. He was an assistant instructor at Lowell Textile Institute and has had experience as a textile chemist at the Jeffersonville Quartermaster Depot. He has been with the A.A.T.C.C. since 1944 and his most recent work has been on water repellency and detergency.

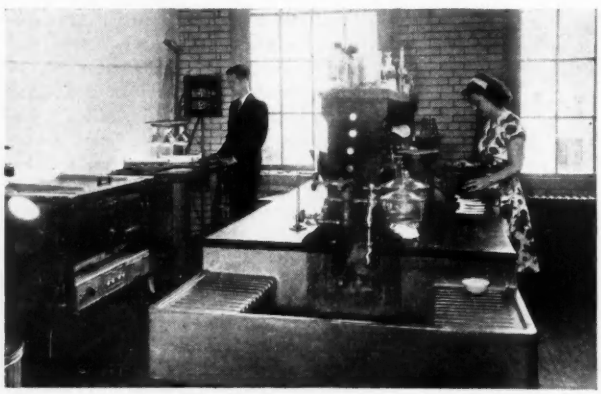
Roger C. Griffin, Jr., Research Assistant of the A.A.T.C.C., received a part of his education at Harvard University and obtained both his bachelor's and master's degrees at Lowell Textile Institute. He has had experience as a research chemist in organic chemistry at A. D. Little, Inc., and was the recipient of the American Viscose Corporation Fellowship for two years, working on dimensional changes of rayon fabrics. He has been with the A.A. T.C.C. since 1945 and his most recent



Interior view of the new Conditioning Laboratory. Shown, left to right, are: George J. Mandikos, G. Robert Thompson, Dr. Louis A. Olney and Dr. Harold W. Stiegler.

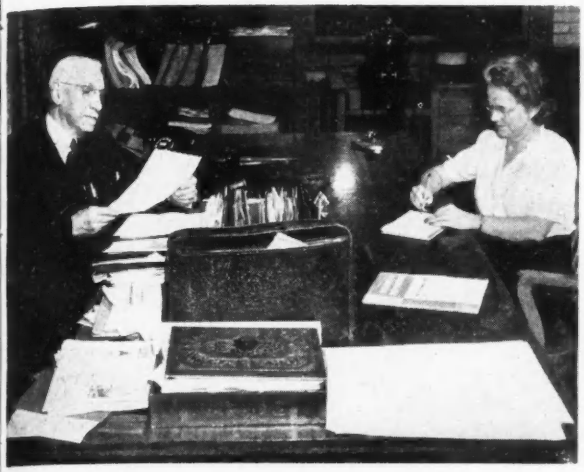


In the foreground is shown a Fade-O-Meter and in the rear a National Carbon Color Fading Unit.

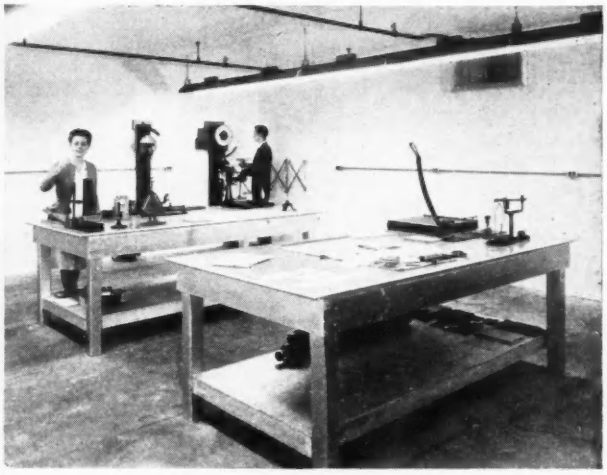


Left: View of the Small Laboratory. Roger C. Griffin, Jr., is at left and Mrs. Vesta Roy at right. The dimensional restorability instrument is under the infra red lamps and color measurement work is conducted at the right.

Below: G. Robert Thompson is shown in the General Research Laboratory.



Dr. Louis A. Olney, chairman of the Research Committee, with his secretary, Mrs. Mona Mackenzie.



Another view of the Conditioning Laboratory. Mrs. Vesta Roy and Roger C. Griffin, Jr., are shown.

work has been on tests for perspiration and urine fastness.

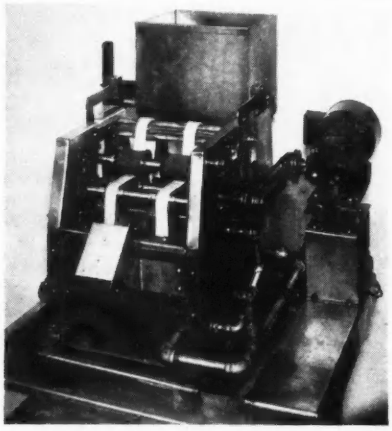
Research Work at Other Locations

In addition to the research staff at the Lowell Textile Institute, the A.A.T.C.C. also is sponsoring research projects at other locations.

Miss Jeanne Bull is doing work for the Wash Fastness Committee at the laboratory of J. C. Penney Co., in New York City, under the direction of Charles W. Dorn, Chairman of this committee. Further work for this committee is being done at the University of Tennessee in Chattanooga by Mrs. Margaret J. Travis under the direction of Miss Mary Shelton, Assistant Professor in the Department of Home Economics.

At Lehigh University a project will be under way shortly which will be under the direction of Professors Neville and Ewing. This will be financed by the International Salt Company and will consist of a comparison of the use of common salt versus Glauber's salt in dyeing processes.

The Fellowship of the American Viscose Corporation, under which Mr. Griffin was working, will become active again shortly.



The Detergency Comparator

Miss Lorraine Marchand
Secretary to Dr. Stiegler

Chairman of the Research Committee

The coordination and guidance of the work of the Research Committee, its subcommittees, and the paid staff, in the past, have been the responsibility of the Chairman of the Research Committee. The success of the research work of the A.A.T.C.C. has been due in no small measure to the one man who has held this position from the beginning, Dr. Louis A. Olney. He now has the aid of an executive committee on research and the Director of Research and the Association is fortunate in having him continue to serve as Chairman of the Research Committee with headquarters at the A.A.T.C.C. laboratory at Lowell.

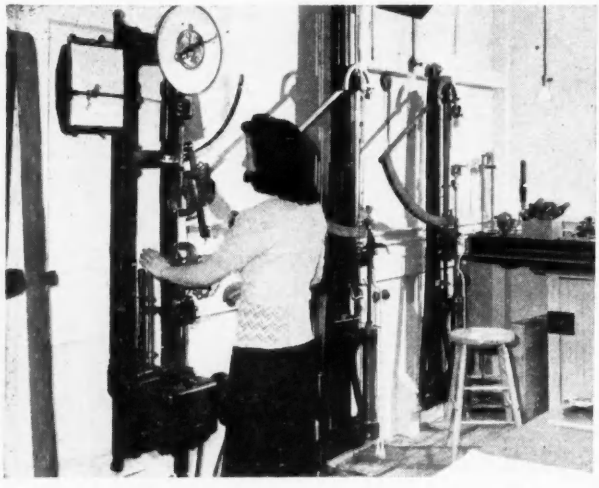
Other Assistants

Other assistants at the Lowell laboratories are Miss Lorraine Marchand, as secretary to Dr. Stiegler, and Mrs. Vesta M. Roy, laboratory assistant.

LABORATORY FACILITIES

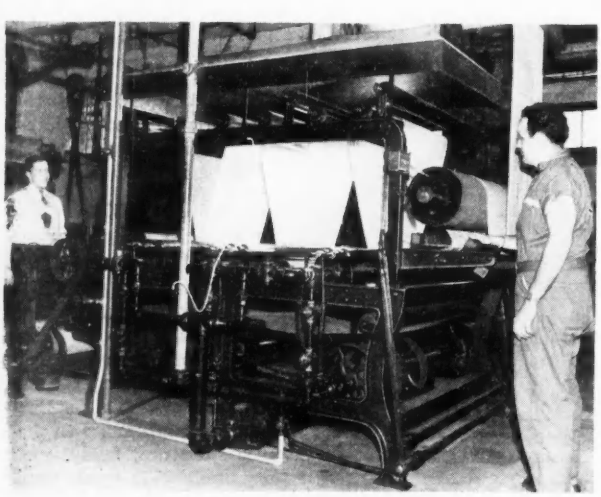
The physical set-up of the A.A.T.C.C. laboratories at Lowell Textile Institute consists of one large and one small laboratory, two offices, a color measurement and fading room, a work-shop for making experimental equipment, two storage rooms, and a large conditioning laboratory. Space is also available for the construction of another laboratory in the near future. The space now being used occupies approximately 2500 square feet.

A corner of the Institute's Analytical Laboratory.

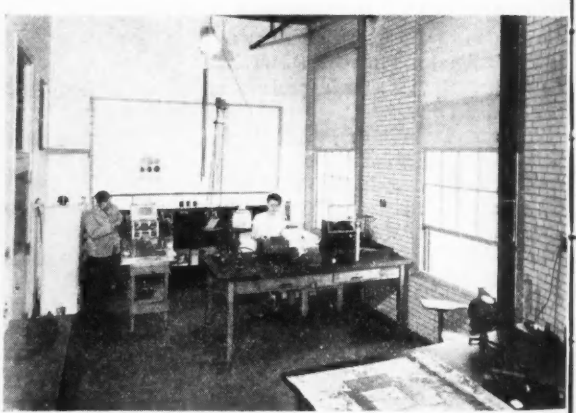


A part of the Testing Room in the Institute's Engineering Department.

A part of the Institute's Microscopy Laboratory.



A Singeing Machine in the Institute's Finishing Department.



Another view of the A.A.T.C.C. General Research Laboratory. Shown are: G. Robert Thompson and Mrs. Vesta Roy.

In addition Dr. H. C. Chapin, National Secretary, is Assistant Professor at the Lowell Textile Institute, and has headquarters there for various duties in connection with the secretary's work.

The conditioning room, which just recently has been completed, occupies about 600 square feet. The Association appropriated $5,000 for the construction of this room. About the same amount of space, adjoining this room. is available for the construction of an additional laboratory.

By arrangement with the Institute, the Association is also able to make use of facilities at the school, such as a well-equipped library, laboratories, and mill and miniature size textile processing equipment.

USE OF FACILITIES AT LOWELL

The use of the facilities at Lowell is not intended to replace the work done in other laboratories by sub-committee members but rather to supplement this work. In cases where aid at the Lowell laboratories is needed the sub-committee chairman submits his problem to the chairman of the research committee and, when advisable, it is referred next to the director of research. If men and space are available, the work becomes an active project at Lowell. As soon as the number of such projects at Lowell warrants it, further research assistants will be added.

NOTICE TO LOCAL SECRETARIES

Please notify the American Dyestuff Reporter, as soon as possible, of your 1946-47 meeting dates.

Spectrophotometric and Colorimetric Determination of the Colors of the TCCA STANDARD COLOR CARDS*

GENEVIEVE REIMANN†, DEANE B. JUDD**, and HARRY J. KEEGAN**

Abstract: The Color Cards of The Textile Color Card Association of the United States are used in the textile and allied industries and by many procuring agencies of the Federal Government. The Association issues both seasonal and standard color cards. The seasonal cards provide a color forecasting service to textile manufacturers and promote color coordination among the trades; the standard cards present colors for which there is a popular and continuing demand. Most important of the color cards is the Standard Color Card of America, the current ninth edition containing 216 colors. Preeminent among the many special sets of color cards issued by the Association for use of the Federal Government is the United States Army Color Card showing 22 official colors for the arms and services. The colors of these two standard color cards have been determined by basic spectrophotometric and colorimetric procedures. From this study there have been found daylight reflectance, Y, ICI chromaticity coordinates (x, y), Munsell book notations and renotations, and ISCC-NBS color designations. These results permit the TCCA standards to be correlated with the American War Standard Z44-1942.

I. INTRODUCTION

SINCE its formation, growing out of interference with normal communication with Europe in the first world war, The Textile Color Card Association of the United States has performed two distinct services for the textile and allied industries. The first is a color forecasting service so that the textile manufacturer, dyer and dyestuff producer may each plan his production with confidence that his choice of colors will be both procurable and salable and will dovetail satisfactorily with that for merchandise from other industries serving the fashion trades. In this way the manufacturer and retailer are protected to a considerable extent from accumulating large stocks of goods that will not sell, and the customer is supplied with a coordinated instead of haphazard selection. The second service is to standardize colors for the textile and allied industries so that the standard name will always signify the same color. By this standardization the ordering of merchandise is greatly facilitated.

The color standardization is accomplished chiefly by the issuance of the TCCA Standard Color Card of America which is supplemented by seasonal cards giving the color forecast. All seasonal colors are automatically standardized under the TCCA system of numbering and naming colors. The Ninth Edition of the Standard Color Card of America[20] was issued in 1941 and includes 216 colors for which there is a continuing demand. These cards are used in the textile and allied industries and are recognized as authoritative guides. They are also used in color specification by Government agencies and by industries quite unrelated to the fashion trades.

In addition to these services to industry, The Textile Color Card Association has cooperated with the procuring agencies of the Federal Government by issuing many special sets of color standards for various purposes. Preeminent among these is the United States Army Color Card [21] showing the official colors for the arms and services. This card was originally issued in 1930; it was revised first in 1938 and again in 1943 so as to include 22 colors. It has been approved and accepted by the Quartermaster General, United States Army.

During the last decade increasing use has been made of the spectrophotometer in standardizing color and of the Munsell notation to specify it. This use of the spectrophotometer and of the Munsell color system was recognized by the American Standards Association in its American War Standard Z-44-1942[1] for the specification and description of color. Standard Z44-1942 provides (1) that the spectrophotometer shall be recognized as the basic instrument in color specification, (2) that spectrophotometric data shall be reduced in accord with the methods recommended in 1931 by the International Commission on Illumination[5, 7, 18] (ICI), (3) that suitably calibrated working standards of color such as those of the Munsell Book of Color[14] be used wherever applicable, and (4) that if a color designation is required for general comprehensibility with precision unimportant the ISCC-NBS method of designating colors be used.[8]

The American War Standard Z44-1942 was intended primarily to assist subcontractors to comply with color requirements by providing a unified set of coordinated procedures applicable to the specification of any color. To a large extent it succeeded in doing this. Commercially available recording spectrophotometers are conveniently applicable to all non-structured, nonpolarizing, nonfluorescent specimens. There is a Munsell notation for any object color. There are Munsell working standards covering a large part of the whole object-color. The methods identified in Z44-1942 were successfully applied in specifying many colors not to be found among the TCCA standards.

On the other hand, there is a great practical advantage in using one of the TCCA standards in the procurement of textiles. The 238 colors measured in the present study are those most used in textiles. In the convenient and comparatively small space of the TCCA cards, the Government or industrial buyer will find a suitable color for perhaps 90 percent of his requirements. Since the standard color cards are recognized and widely used in the textile and allied industries, he can short-circuit the more general, and more technical, methods of Z44-1942; and

---

*This is a condensed account of the work described completely in J. Research NBS. 36, 209 (March, 1946); RP 1700; also J. Opt. Soc. Am. 36, 128 (March, 1946). Paper read at Discussion Session, May 6, 1946, co-sponsored by the Textile Color Card Association of the U. S. Inc. and the American Association of Textile Chemists and Colorists at the 15th Annual Meeting Inter-Society Color Council.

†Research Associate of The Textile Color Card Association.

**Physicist, National Bureau of Standards.

get what he wants more certainly and more quickly.

There are immediate advantages to be gained from the correlation of the TCCA colors with Z44-1942. The first is that those who work with other sets of material color standards similarly correlated can tell when the practically convenient TCCA standards can be used and can pick out the name and cable number to be mentioned. The information tabulated in the present paper, therefore. supplies to industrial and government buvers much of the advantage of owning the TCCA color cards. Since they will know in this way what colors are conveniently available in textiles, this correlation will keep them from using other less suitable materials merely from uncertainty as to a practical procurement procedure.

Even if all industrial and government buyers were supplied with the TCCA color cards, there would still be a need for correlation. Many agencies work by fundamental methods alone. They may have a color requirement expressed in fundamental terms. When they have to deal with suppliers who do not understand these terms they will avoid working standards not fundamentally celibrated and will turn to calibrated standards.

An example of this use of the present calibrations has already come to our attention and may be worth citing. During the war the color of life-preservers was chosen so as to be inconspicuous in the water lest enemy forces strafe our survivors. With the close of hostilities, a new color was indicated for life-preservers,—one that should assist the rescue by being as conspicuous as possible in a choppy sea. This color had already been determined for another purpose by a war agency by observation of painted objects floating in the sea. It was found that white and yellow objects were confused with white-caps, and that red and other dark colored objects were likely not to be seen at all. A certain reddish orange was found to be the most conspicuous in a choppy sea and was specified by Federal Specification TT-P-59, Paints, Ready Mixed, International Orange.[2] This color is defined in TT-P-59 in terms of daylight reflectance, Y, and ICI chromaticity coordinates (x,y). A procurement officer in the Coast Guard was instructed to obtain a supply of duck for life-preserver covers which when wet should approach as closely as possible the color of International Orange. The procurement officer on telegraphing the TCCA office in New York learned from the results of the present paper that the nearest TCCA standard color to International Orange is 70072, Indian Orange. In this way the calibration of the TCCA color standards assisted in the procurement.

At the 15th Annual Meeting of the Inter-Society Color Council, a discussion session on "Colorimetric Standardization of the Colors of the TCCA Standard Color Cards" was held on May 6th. It was co-sponsored by the Textile Color Card Association of the United States, Inc., and the American Association of Textile Chemists and Colorists.

Following the presentation of the main theme of the discussion period by Genevieve Reimann, Deane B. Judd and Harry J. Keegan, parts in the discussion were taken by I. H. Godlove, E. I. Stearns and J. F. Warner. We are publishing in this issue the main paper and also the remarks by Mr. Stearns and Mr. Warner. The remarks by Dr. Godlove will follow in the near future.

This correlation of the TCCA color standards with fundamental methods of color specification should thus prove to be of particular value to the possessors of the Standard Color Card of America. The tables giving the results of the calibration will serve as a supplement enabling the user of the Standard Color Card to find the equivalent TCCA color standard or the nearest TCCA color standard for any required color specified either in ICI or Munsell terms.

These are the immediate advantages of correlating the TCCA standards with the technical methods now for the first time coming into consideration for practical use. It is not possible to foresee the ultimate usefulness of this correlation. Just as the modern automobile with interchangeable parts is made possible by fundamental standards of length combined with accurate and practical secondary length standards, so also may we expect American industry to find important, and as yet largely unforeseen, ways to make use of these sets of color standards once they have acquired permanent meaning.

II. GENERAL CONSIDERATIONS

The samples of the Ninth Edition of the Standard Color Card of America are made of satin-finish pure dye silk, the back or matte side being displayed over most of the area of each. Figure 1A is a photomicrograph showing this weave. The samples of the Army card are of pure-dyed silk ribbon, half of satin-finish, half of grosgrain or ribbed finish. Figure 1B shows the grosgrain weave. The brilliance of many of the colors of both sets is partly due to the use of fluorescent dyes. The high luster of the silk fibers assists in the attainment of this brilliance.

It is obvious that to be generally useful the correlation between the TCCA standards and nonfluorescent, nonlustrous working standards, such as the Munsell standards, evaluated according to ASA Z44-1942, must hold for comparison of such standards in natural diffused daylight near a window. This is the customary condition under which such comparisons are carried out. This requirement gives an approximate definition both of the spectral distribution of the illumination that has to be adopted, and of its angular distribution. As sufficiently close to the spectral character of average natural diffused daylight, we have taken ICI standard illuminant C[5, 7, 18] as recommended by Z44-1942, or alternatively, Macbeth artificial daylight[16] of color temperature about 6800° K. To characterize the desired angular distribution we have taken illumination incident on the samples along angles spreading through a range of 50 to 70° roughly centering upon an angle of 45° from the surface. This angular distribution of illumination can usually be obtained by placing the samples flat on a table near a vertical window illuminated by light from the sky. The difficulties involved in the measurement of fluorescent and lustrous samples are well known; but some of them will now be recalled.

A. Fluorescence

A fluorescent sample is one which when irradiated by energy of one wavelength emits energy of a different (usually greater) wavelength. It is believed that no spectrophotometer exists at the present time (1946) that can make adequate measurements of fluorescent textile samples. No colorimeter gives meaningful results unless the fluorescent sample is irradiated by standard daylight. Flourescent samples must therefore be measured by technics not required for non-fluorescent samples.

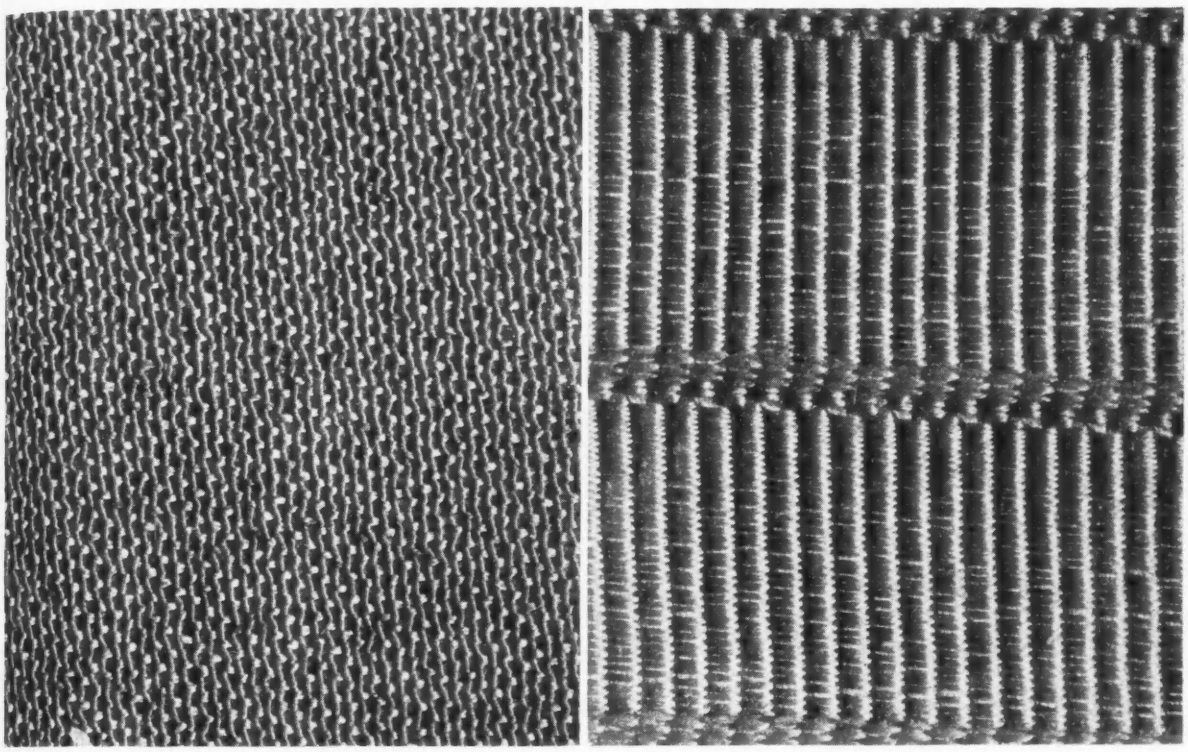
B. Luster

A matte sample has the same color regardless of the angular conditions of its illumination and viewing; but a lustrous sample takes on different colors. No existing spectrophotometer or colorimeter possesses exactly the illuminating and viewing conditions adopted here as standard. The colors measured in the instruments used in the present study are not exactly those of the samples under the standard angular conditions, but the measurements have been corrected so that they do apply to these standard conditions.

III. METHOD

The present measurements were carried out on 4-inch square samples of the Standard Color Card of America supplied especially for these studies by The Textile Color Card Association. The measurements were made on the matte side of the samples; none were made on the shiny side. Five of the Army cards were also supplied, and measurements were made on the grosgrain portions of the samples only.

In addition to the instrumental measurements, all samples in the official copy



A *B*

Figure 1.—Photomicrographs showing the weave of the fabric samples measured: (A) matte portion of sample typical of those of the Standard Color Card of America, (B) grosgrain portion of sample typical of those of the United States Army Color Card.

of the Standard Color Card of America which had been placed in the vaults of the National Bureau of Standards early in 1942, all samples of the Army card, and many of the 4-inch square samples were compared with the color scales of the Munsell Book of Color. The 4-inch square samples were also compared with the corresponding sample in the official copy.

A. Recording Spectrophotometer

The spectrophotometer was the General Electric photoelectric recording type[12] which irradiates the samples nearly along the perpendicular to the sample surface and collects the energy reflected nearly regardless of direction. Each curve sheet was completely calibrated[3] and the samples were run twice in double layer, backed by white paper first with the ridges at 45° from the vertical, second with the sample rotated in its own plane through 90° from the first position. Figure 2 shows a typical curve sheet complete with calibration curve. The curves were read twice independently by different observers, and zero, 100 percent, and wavelength-scale corrections applied. Daylight reflectance relative to magnesium oxide[17], Y, and ICI chromaticity coordinates (x, y) were computed by the method of 10 $m\mu$ summation.[16]

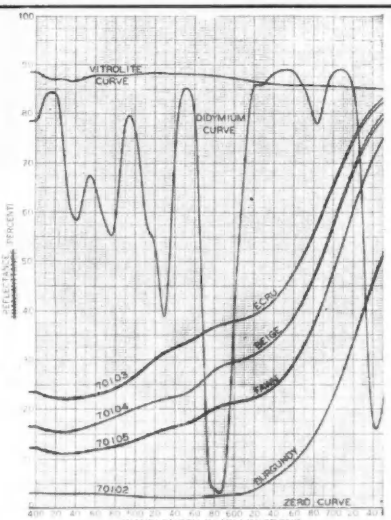


Figure 2.—Typical curve sheet drawn by recording spectrophotometer with 19-$m\mu$ spectral band. Three of the seven curves shown are for calibration (zero curve, Vitrolite curve, didymium curve); the remaining four indicate spectral reflectance of samples from the Standard Color Card of America.

B. Multipurpose Reflectometer

The 216 samples of the standard card were measured in single thickness on the multipurpose reflectometer[6] both with black-paper and white-paper backings. These measurements were reduced so as to refer to a double layer. Each sample was oriented in its own plane so that the ridges of the fabric were parallel to the plane containing the axis of the illuminating beam and the perpendicular to the sample. This axis was at 45° to the surface, and the axis of the directions along which reflected light can fall upon the photocell is perpendicular to the surface of the sample.

The 22 samples of the Army card were also measured. The orientation was similar to that of the samples of the standard card, and the measurements were repeated for each sample turned in its own plane through 90°. The mean of the two reflectances so found was taken.

C. Chromaticity-difference Colorimeter

Each of the 238 samples was compared by means of the chromaticity-difference colorimeter[9] either with another TCCA sample of a neighboring color or with at least one of the Munsell standards. This instrument illuminates the sample with Macbeth daylight of color temperature 6800°K. The direction of illumination is perpendicular to the surface of the sample, the direction of view at 45°. Each sample was used in double thickness

backed by white cardboard, and was oriented in its own plane so that the ridges of the fabric were parallel to the plane containing the viewing direction and the perpendicular to the sample. Strongly fluorescent samples were compared with one or more Munsell standards[4, 10] and ICI chromaticity coordinates (x,y) found.

D. Macbeth-Martens Reflectometer

Each of the 50 or more samples classified as strongly fluorescent were compared in double thickness to a Munsell standard of nearly the same color by means of a Macbeth Lamp[16] and a Martens photometer.[11] The illumination centered about 45° to the sample surface and was somewhat diffused since it came partly from the frosted bulb and partly from a white reflector by transmission through a 7-inch roundel ground on one side and separated from the sample by only 8 inches. The angular spread was about 50° but the illumination was concentrated preponderantly in the center of this spread. The direction of observation was about 7° from the perpendicular. Each sample was oriented in its own plane so that the ridges of the fabric were parellel to the plane containing the axis of the illuminating beam and the axis of the Martens photometer.

E. Munsell Book Notations

Each of the 238 mounted samples was compared with the color scales of the Munsell Book of Color (complete 40-hue-chart edition, 1929 and 1942)[11] by one observer and Munsell book notation found in the usual way by visual interpolation and extrapolation along these scales. The samples and scales were placed in closely the same plane and illuminated at approximately 45° by light from the north sky passing through a vertical window of such size as to yield an angular spread of directions of illumination between 50 and 70°. The samples were oriented so that the ridges of the fabric were parallel to the plane containing the central direction of illumination and the perpendicular to the sample. The direction of view was nearly perpendicular to the surfaces of the samples.

The Munsell book notation so found for each sample was converted into chromaticity coordinates (x,y) by interpolation and extrapolation on large-scale (x,y)-charts prepared for that purpose.

From the Munsell book notation there were also found estimates of daylight reflectance, Y. These estimates were found by converting book-notation value first into renotation value by adding to the book-notation value of the textile sample the average difference between the renotation and book-notation values of the neighboring Munsell samples. Renotation values were converted into daylight reflectance, Y, by means of Table II of the Final Report of the OSA Subcommittee on the Spacing of the Munsell Colors.[15]

IV. RESULTS

The results of the measurements by these instruments and methods have been compared and whenever discrepancies were found they were studied until the causes were established. An account of these studies may be found in the complete paper.[19] The most important of these causes was found to be fluorescence of the standards. Out of the 238 standards, 55 were found to be so strongly fluorescent that no significance could be attached to the spectrophotometric measurement. The second most important source of discrepancy was found to be variation in the angular conditions of illuminating and viewing the standards. Results by methods found to be inapplicable were either discarded or corrections were applied. The final adopted values are given in Table 1, shown here only in part, soon to be published in full by the TCCA. This table identifies the standards by TCCA name and cable number. It gives the ICI specification[5, 7, 18] consisting of daylight reflectance, Y, relative to magnesium oxide, and chromaticity coordinates, x and y. There are also given the Munsell renotation[15] and book notation[11], and finally the ISCC-NBS color designation[10], all derived in the customary way from the ICI specification. The recommendations of American War Standard Z44-1942[1] have thus been complied with.

Table 1 will be useful to everyone having the TCCA standard cards at his disposal and to anyone desiring the correlate these standards with fundamental methods of color specification. The third column of the table, for example, gives the daylight reflectance, Y, of the standard; that is, it gives the fraction of incident daylight reflected. This fraction is of particular interest to illuminating engineers in their calculations regarding interiors containing draperies as a part of the decoration. Extensive use of draperies of low reflectance requires corresponding increase in number and intensity of luminaires. Merely by looking at the standard, a practiced illuminating engineer can tell approximately the effect which will be produced in this regard, but daylight reflectance indicates it precisely.

Daylight reflectance and chromaticity coordinates (x,y) are used to specify paint in Federal Specifications,[21a] Whenever it becomes necessary to correlate the colors of textiles with paint colors, the ICI specifications (Y, x, y) for the TCCA standard may be time-saving. The availability of such information can forestall the displacement of textiles by less suitable materials.

An example of such correlation is the current work of the American Standards Association in setting up a standard for marking industrial hazards and obstructions. A particular red, yellow and green were to be chosen for definite meanings in industrial establishments, and although the principal medium for producing these colors is expected to be paint, the committee did not wish to exclude ceramic or textile materials by choosing colors capable of being produced only by paint. Furthermore, the red, yellow and green must be distinct not only to those possessing normal color vision but also to those having color deficiencies making them confuse some reds and greens. The use of daylight reflectance, Y, and chromaticity coordinates, x and y, for this work was dictated by two considerations: first because ASA Z44-1942 required it, and second because red-green confusions of the usual types are found in a simple way from the chromaticity coordinates, x and y. By the use of the information in Table 1 the committee was able to draft a specification meeting all requirements. This specification permits the use of Pimento Red (70042), Lemon Yellow (70205) and Primitive Green (70167) as safety color code colors. If this information had not been available, textile materials might have been arbitrarily excluded.

The Munsell renotations specify color in terms of ideal Munsell hue, value and chroma.[15] Munsell hue[15] is indicated by a combination number-letter symbol. The letters (R, Y, G, B. P, respectively for red, yellow, green, blue, purple) indicate the approximate hue; the number, which precedes it, indicates the precise hue. Each hue range designated by a single or double letter, such as R, for red, and YR for yellow-red, is divided into ten steps. Thus the red range extends from red-purple (10RP) by the steps 1R, 2R, 3R . . . 10R, the next hue step being 1YR.

Munsell value, V/, is indicated on a scale extending from zero for the darkest color (black) to 10 for the lightest (white). The daylight reflectance, Y, of a sample determines its renotation value. Munsell value, V/, is approximately equal to the square-root of the reflectance in percent, ($100Y^{1/2}$). For the exact relation, refer to the Report of the OSA Subcommittee on the Spacing of the Munsell Colors.[15] Thus, Munsell renotation value is reflectance expressed according to a nonlinear scale, the steps of which have been adjusted so as to appear equal. A nearly neutral gray like Steel (70153) has a value close to 5, indicating that in appearance it differs from white about as much as it does from black. Burnt Orange

TABLE 1. - ADOPTED COLOR SPECIFICATIONS FOR THE TCCA STANDARD COLOR CARD OF AMERICA, NINTH EDITION, AND THE U. S. ARMY COLOR CARD

TCCA Name	Cable No.	ICI Specification			Munsell		ISCC-NBS Color Designation
		Y	x	y	Renotation H V / C	Book Notation H V / C	
SPRING GREEN	70061	.348	.353	.459	6.3GY 6.4/7.2	6.8GY 6.2/6.8	moderate yellowish green
MINTLEAF	70062	.289	.324	.458	8.8GY 5.9/7.6	9.6GY 5.7/7.5	moderate yellowish green
EMERALD	70063	.163	.286	.478	1.2G 4.6/8.2	1.4G 4.5/8.8	moderate yellowish green
HUNTER	70064	.070	.290	.434	1.0G 3.1/5.1	1.5G 2.8/4.6	very dark yellowish green
MYRTLE	70065	.074	.264	.397	4.5G 3.2/5.1	5.2G 2.9/4.3	dark green
BOTTLE GREEN	70066	.043	.281	.363	4.9G 2.4/2.9	4.1G 2.1/2.6	very dusky green
JASMINE	70067	.659	.414	.424	3.6Y 8.4/7.7	3.5Y 8.2/8.0	moderate yellow
SPANISH YELLOW	70068	.525	.482	.448	0.4Y 7.6/12.2	10YR 7.6/11	strong yellowish orange
ORANGE	70069	.380	.516	.419	5.7YR 6.6/12.7	5YR 6.6/13	strong orange
PRINCETON ORANGE	70070	.347	.519	.406	4.3YR 6.4/12.5	3.3YR 6.4/12.6	strong orange
GOLDEN POPPY	70071	.264	.555	.386	1.6YR 5.7/13.8	1YR 5.6/14	strong reddish orange
INDIAN ORANGE	70072	.203	.560	.359	9.4R 5.1/13.2	9R 5.1/14	strong reddish orange
PERIWINKLE	70073	.166	.253	.227	8.7PB 4.6/6.8	8.8PB 4.5/6.6	moderate bluish purple
CORNFLOWER BLUE	70074	.110	.222	.176	8.4PB 3.8/9.8	9PB 3.8/11	strong bluish purple
OLD GLORY BLUE	70075	.040	.229	.186	8.2PB 2.3/6.1	8.6PB 2.1/5.3	dark bluish purple
INDEPENDENCE	70076	.030	.241	.209	7.8PB 2.0/4.3	8.0PB 1.8/3.1	dusky bluish purple
NATIONAL FLAG BLUE	70077	.025	.259	.238	7.6PB 1.7/2.5	8PB 1.5/1.8	dusky purplish blue
HOMAGE BLUE	70078	.023	.269	.252	7.7PB 1.7/2.0	8PB 1.5/1.4	purplish black
GERANIUM	70079	.201	.509	.297	2.7R 5.0/14.0	3R 5.0/15	vivid purplish red
SCARLET	70080	.153	.567	.307	4.9R 4.5/14.9	5R 4.4/15	vivid red
CARDINAL	70081	.086	.528	.300	4.1R 3.4/10.6	4R 3.3/12	deep red
DARK CARDINAL	70082	.056	.480	.290	2.8R 2.8/7.7	4R 2.5/10	deep red
GARNET	70083	.041	.422	.294	3.0R 2.3/4.9	4.6R 2.0/7.0	very dark red
MAROON	70084	.042	.383	.294	1.0R 2.4/3.5	2.9R 2.1/3.9	very dusky purplish red
LUSTRE BLUE	70085	.081	.213	.188	6.6PB 3.3/7.9	6.8PB 3.2/8.3	moderate purplish blue
YALE BLUE	70086	.063	.204	.165	7.3PB 2.9/8.8	7.2PB 2.9/9.1	strong purplish blue
ROYAL BLUE	70087	.041	.195	.153	6.9PB 2.3/8.4	7.3PB 2.1/7.7	dark purplish blue
NAVY 1	70088	.039	.238	.226	5.8PB 2.3/3.9	6.2PB 2.1/2.8	dusky purplish blue
NAVY 2	70089	.027	.240	.230	5.7PB 1.8/3.2	6.0PB 1.7/2.6	dusky purplish blue
MIDNIGHT	70090	.022	.263	.255	6.0PB 1.6/1.9	6PB 1.4/1.5	bluish black
CHAMPAGNE	70091	.518	.366	.358	8.5YR 7.6/3.5	9.2YR 7.5/4.0	pale to weak orange
CORK	70092	.237	.393	.366	6.8YR 5.4/4.0	7.3YR 5.4/4.1	light brown
SANDALWOOD	70093	.178	.392	.362	6.0YR 4.8/3.6	6.9YR 4.6/3.3	light brown
OAKWOOD	70094	.124	.411	.366	5.2YR 4.1/3.7	5.5YR 3.8/3.3	moderate brown
TOBACCO	70095	.053	.418	.358	4.3YR 2.7/3.1	4.2YR 2.5/3.7	dark brown

TABLE 2 - GROUP II - MEDIUM AND DEEP SHADES

ISCC-NBS Color Designation	Munsell Renotation	TCCA Cable Number	TCCA Color Name
Dark to deep Yellow	3.9 Y 6.4/9.3	70215	NUGGET GOLD
Weak greenish Yellow	5.3 Y 7.0/4.5	70183	GOLDMIST
Weak yellowish Orange	2.4 Y 8.2/4.2	70005	LEGHORN
Weak yellowish Orange	1.6 Y 8.2/2.5	70004	EGGSHELL
Weak yellowish Orange	1.2 Y 6.8/3.5	70187	FLAX
Weak yellowish Orange	9.0 YR 7.2/5.4	65015	BUFF
Weak yellowish Orange	8.2 YR 8.0/4.4	70127	SUNSET
	1.3 Y 5.7/7.1	70158	GOLD
Dusky yellowish Orange	2.3 Y 6.1/6.9	70157	OLD GOLD
Dusky yellowish Orange	8.6 YR 6.6/5.9	70115	AMBERLITE
Pale to weak Orange	8.5 YR 7.6/3.5	70091	CHAMPAGNE
Weak Orange	7.3 YR 6.1/6.8	70116	TOPAZ
Weak Orange	5.5 YR 6.9/6.1	70037	APRICOT
Moderate Orange	2.5 YR 7.0/8.3	70038	HONEYDEW
Strong Orange	3.8 YR 6.1/11.4	65003	GOLDEN ORANGE
Strong Orange	4.3 YR 6.4/12.5	70070	PRINCETON ORANGE
Strong Orange	5.7 YR 6.6/12.7	70069	ORANGE
Strong Orange	7.8 YR 6.9/13.2	65002	YELLOW
Light reddish Orange	5.1 R 6.7/11.5	70028	MELON PINK
Weak reddish Orange	6.8 R 6.1/5.5	70124	GRECIAN ROSE
Weak reddish Orange	6.6 R 4.9/6.1	70125	BOIS DE ROSE
Moderate reddish Orange	1.5 YR 4.8/9.2	70160	BURNT ORANGE
Moderate to strong reddish Orange	5.9 R 5.6/11.3	70029	TIGERLILY
Strong reddish Orange	1.6 YR 5.7/13.8	70071	GOLDEN POPPY
Strong reddish Orange	9.5 R 5.2/13.2	65004	ORANGE
Strong reddish Orange	9.4 R 5.1/13.2	70072	INDIAN ORANGE
Strong reddish Orange	8.8 R 6.3/10.7	70039	SALMON
Strong reddish Orange	7.7 R 5.9/11.5	70149	CRAB APPLE
Strong reddish Orange	7.4 R 4.7/11.9	70040	TANGERINE
Strong reddish Orange	7.3 R 4.8/12.7	70030	FLAME RED
Vivid reddish Orange	8.2 R 4.6/14.3	70041	PAPRICA
Dark reddish Orange	7.3 R 4.0/9.5	70150	LACQUER

*The Munsell renotations have been included here to indicate precisely the nature of the color differences between neighboring samples. They should not be used, however, for actual comparison with the samples of the Munsell Book of Color. For Munsell book notations, see Table I.

(70160) likewise differs in appearance from white about as much as it does from black, and likewise has a value of about 5.

Munsell chroma, /C, indicates the degree of difference, judged visually, between the color to be specified and the gray of the same value. The chroma scale progresses from zero for gray by perceptually uniform steps to a maximum chroma that is different for each hue and value. A near gray like Steel (70153) has a chroma that is nearly zero (/0.8); a strongly chromatic color like Burnt Orange (70160) has a much higher chroma (/9.2), the chroma limit for this hue being close to that of Golden Poppy (70071) whose renotation chroma is /13.8.

In general it may be said that the ICI specifications are related to the technology of paints, plastics, ceramic materials, and illuminating engineering; the Munsell renotations give the same information in a form that is easily understood because it correlates in the simplest possible way with the appearance of the color.

The Munsell book notations are what would be obtained by actual comparison with the color scales of the Munsell Book of Color. They differ from the ideal renotations because of small deviations of the samples in the Munsell Book of Color from the corresponding ideal colors. These deviations are due to technical difficulties and are negligible for many purposes. Thus Harvard Crimson (70050) is identified as a somewhat purplish red (1.5R somewhat on the dark side (3.2/), and very different (/12) from any gray by its book notation 1.5R 3.2/12. This identification is just as satisfactory for general cataloguing as its Munsell renotation 0.7R 3.4/10.3; but for standardization the difference between these two notations is important. For many of the standards, however, the difference between renotation and book notation is quite negligible because it does not exceed the estimated uncertainty of the present determinations: 0.1 value step, 0.4 chroma step, 0.5 hue step (above chroma /2). See, for example, Yale Blue (70086), Eggplant (70165), and Lemon Yellow (70205). However, the book notations are given explicitly in Table 1 so that comparisons with the current editions of the Munsell Book of Color will be valid to the full extent made possible by the measurements; the book notations are therefore for immediate practical use. The Munsell renotations refer to the ideal system which these standards are expected to approach as the years go on; their greatest use lies in the future.

The last column of Table 1 gives the ISCC-NBS color designation worked out in 1939 at the National Bureau of Standards according to a plan devised by the Inter-Society Color Council[10]. This designation consists of common words in everyday use combined in a logical way to give a color designation understandable to all English-speaking people. From the good agreement between the TCCA name and the ISCC-NBS color designation it may be seen that the TCCA names, although established many years before the ISCC-NBS system, are generally understandable to the public; and have been chosen with wise regard to popular usage. There are, however, a number of notable exceptions, such as 70018, 70078, 70178 and 70195. A study of these exceptions shows that minor revisions of the ISCC-NBS boundaries are quite feasible which would bring the method into considerably improved agreement with accepted color terminology in textiles. It is possible that a proposal for such boundary revisions will be submitted to the Inter-Society Color Council.

The purpose of Table 2, an excerpt from which is shown, is to facilitate, through the use of the ISCC-NBS designations, the finding of the particular TCCA standard that is the most satisfactory equivalent of any given color standard used in some other field. This table has been divided into four distinct series of colors, one for the light tints or pastel shades including white and all light and pale colors, the second series of medium and deep shades, which includes all of the middle colors particularly those of strong chroma, with the exception of the browns which are included in a third series with all of the related colors. Lastly, a fourth series consists of neutral or near-gray shades, extending from the whites, repeated from the pastel shades through the middle grays and blacks.

The columns in each series of the table give the ISCC-NBS color designation followed by the Munsell renotation, the Cable Number and TCCA Color Name in the order noted. The ISCC-NBS designations were selected in groups according to hue beginning with the yellows and extending through red, purple, blue and green around the hue circuit finally ending with the yellow-green group. The colors were arranged in a logical sequence of the ISCC-NBS designations arranged primarily according to the renotation hue of the color, and secondarily according to value within a given hue. For most purposes this arrangement places close together the colors that are similar and likely to be used together in making comparisons; however, there are a few unavoidable exceptions to this general sequence. Several of the standards are listed in two series and a few are included in three series in order to facilitate comparisons and avoid any standard being left out because it falls slightly outside the color limits of the ISCC-NBS designation. The actual ISCC-NBS name for the standard is omitted in such repeat listings lest the hue order of the table be obscured.

Table 1 is arranged to give conveniently the fundamental information regarding the TCCA standards; Table 2 is intended as a key to Table 1. Tables 1 and 2 are soon to be available directly from the Textile Color Card Association. By correlating the TCCA standards with other methods of specification, it permits those who do not have access to the TCCA standards, themselves, to determine whether one of the TCCA standards would meet their needs. For example, the procurement officer mentioned in the Introduction, who was instructed to obtain a supply of duck for life-preserver covers which when wet should approach as closely as possible the hue of International Orange, would first get the Munsell renotation for International Orange, based upon the ICI specification: Y = 0.131, x = .610, y = .362, given in Federal Specification TT-P-59. The Munsell renotation is found from the Report of the OSA Subcommittee on the Spacing of the Munsell Colors[11] to be about 10R 4.2/14. The procurement officer would look under "vivid reddish orange" and "strong reddish orange", and would find quickly that there are four close duplicates of International Orange; they are Tangerine (70040), Golden Poppy (70071), Indian Orange (70072) and Paprica (70041). Since he has been instructed to duplicate the hue of International Orange, the choice falls to Indian Orange whose Munsell renotation is 9.4R 5.1/13.2. From the renotation value (5.1/) he would discover that Indian Orange is a lighter color than International Orange (4.2/); and from the chroma (/13.2) that it is only slightly more grayish than International Orange (/14). He would start his negotiations for life-preserver duck by asking suppliers to submit duck samples as close to Indian Orange (TCCA Cable No. 70072) as possible.

He also might note incidentally that Paprica (70041) of renotation 8.2R 4.6/14.3 is not only redder than International Orange (compare 8.2R with 10R) but also lighter (compare 4.6 with 4.2) and slightly stronger (compare 14.3 with 14). He knows that International Orange is widely used because of its distinctive appearance, but there is a textile color standard obviously still more distinctive in appearance; it is redder, lighter and stronger. He makes a mental note perhaps subconsciously to consider textiles as a way of improving visibility. Table 2

(Continued on Page P333)

Standard Angular Conditions for the COLORIMETRY OF TEXTILES*

E. I. STEARNS

Research Dept., Calco Chemical Division, American Cyanamid Co.
Chairman of A.A.T.C.C. Delegates to I.S.C.C.

THE title of this discussion may be misleading if one expects to find here the answer to the problem of standard angular conditions for the colorimetry of textiles. Instead, the intention of this discussion is to point out the importance of standard angular conditions and to comment on the solution adopted by the National Bureau of Standards in their measurement of the Textile Color Card Association's samples.[1] The importance of standard angular conditions may easily be demonstrated with the T.C.C.A. samples themselves. These samples consist of a glossy portion and a matte portion which arise by the nature of the weave. If the color card is placed on a flat table by a window and the samples are observed by looking directly down at them, it will be noticed that one-half of the sample is considerably darker than the other. If the angle of view is changed so that the line of vision strikes the sample at a glancing angle, it will be observed that the darkness of the two halves of the sample has been reversed. It is possible to find an intermediate angle at which to view the samples where both halves of the samples appear alike. The T.C.C.A. samples themselves, then, are a striking example of the fact that angular conditions do greatly alter the appearance of some textiles.

Textile men have realized the importance of angular conditions for some time. Consider, for example, the problem of preparation of sample for color matching. Wool raw stock is rather difficult to estimate for color, and accordingly, it is common practice for close color matching to make a pad. This process consists of subjecting the wool fibers to a rubbing action in the presence of some material such as soap and inducing felting. Quite often when such pads are prepared, one for standard and one for sample, they are cut in half so that the standard half and the sample half may be placed adjacent to each other and a comparison made for color. This is a careful arrangement of the sample so that the angular conditions of viewing may be standardized. As another example, consider the judging of carpet yarn. The appearance of carpet yarn from the side is of very little interest, the prime interest being how the fiber looks endwise because this is the way the consumer will look at the pile. Accordingly, it is customary to take a skein consisting of a number of yarns and cut across the yarn so that the sample may be viewed from the end. This type of sample is called a tuft. Here again the sample has been carefully prepared so that it may be viewed with the proper angular conditions. As a final example, consider the comparison of rayon cloth, particularly with a weave effect. It is customary for the color matcher to place the standard piece of cloth upon a large area of the sample piece of cloth but the color comparison is never made until the weave is oriented so that the samples are geometrically similar. In all three of these cases the angular conditions of view have been controlled in the preparation of the sample for color matching.

The color matcher is also particular about the geometry of the illuminant. In the case of color matching by natural light the preferred type of daylight seems to be a diffuse sky and not direct sunlight. This seems to indicate a definite preference for a geometrically diffuse illumination. It should not be inferred by this statement that any intention is desired to minimize the factor of color temperature which also changes from direct sunlight to diffuse daylight. In the case of artificial sources, it will generally be found that the color matcher prefers a large source to a small one. Here again the effect which is important in the present connection is the diffuse nature of the illumination. There is no intention to minimize the importance of increased candle power which results from a large area source.

In viewing the sample, the color matcher may give preference to a particular angular condition but in general the practice is to view the sample under a great many conditions, for it is generally recognized that matches can be obtained with one viewing condition and not with another. This practice is so common that some angles of viewing have been named in the trade. For instance, by "overhand" the American Association of Textile Chemists and Colorists means "viewed when held toward the light and with the line of vision at an acute angle to the surface." In contrast to this, "downhand" is defined by the A.A.T.C.C. as "viewed with the line of vision approximately perpendicular to the surface."

From the above considerations it is evident that the textile color matcher in preparing his sample, in choosing his illumination and in viewing the sample is fully aware of the importance of angular conditions. However, the knowledge of viewing conditions is in the status of an art rather than a science. There has, for instance, been no official and accepted method of viewing for textile samples of all kinds.

When the physicist is required to measure color, he is faced with the same problems of angular conditions of view,. He has recognized this problem and the Inter-Society Color Council has announced as its Problem 12 "Illuminating and Viewing Conditions for Colorimetry." However, the latest official report on this subject is merely "Sub-Committee at work." While this committee hopes to reduce the problem to a science, the situation is still an art as the sub-committee report indicates.

With reference to the original uncorrected data obtained by the N.B.S. in testing the T.C.C.A. samples, it is immediately evident that there is a systematic bias between some of the results. The colorimetric results obtained for samples with the official Munsell method of viewing agree fairly well with the colorimetric results determined from spectrophotometric data but these two sets of results differ from those obtained with the differential colorimeter, with the Hunter reflectometer and with the MacBeth-Martens reflectometer. These latter three instruments are more or less alike but in general show a lesser reflectance. In the N.B.S. report[1] the authors have pointed out that the discrepancies between the sets of data may be explained to a large part by a consideration of the angular conditions of view. It appears that the Munsell and spectrophotometer methods

* Paper read at Discussion Session, May 6, 1946, co-sponsored by the Textile Color Card Association of the U. S., Inc. and the American Association of Textile Chemists and Colorists at the 15th Annual Meeting, Inter-Society Color Council.

[1] G. Reimann, D. B. Judd, H. J. Keegan, J. Opt. Soc. Amer. *36*, 128 (1946).

of measuring the sample result essentially in diffuse-normal viewing while the other methods result essentially in 45°-normal viewing.

Figure 1A of the paper shows the appearance of the cloth when illuminated with light at 45°, and it is quite evident from a study of this photomicrograph that the cloth consists of a great many mountains and valleys and that 45° illumination creates many more shadows than diffuse illumination or normal illumination would produce. The presence of such shadows under 45° illumination would explain the lower over-all apparent reflectance versus a smooth standard.

The authors have proposed the entirely reasonable assumption that less specular component is included in the measurement involving a 45° illumination. The light which is reflected from a textile sample may be considered as consisting of two parts. One part is a surface-reflected light which does not penetrate into the fiber and which in general is reflected back as unchanged daylight in small amount. The other kind of light may be called body light and is light which has penetrated into the fibers and has been affected by the dyestuff present so that when it finally escapes from the fiber and passes to the observer's eye it has a definite color. One would expect some body light to emerge everywhere from the fabric, even in the dark shadows. The surface-reflected light originates only in the directly illuminated area. Therefore, the proposal that the 45° instruments have a smaller specular component seems quite reasonable.

The authors have proposed that by adding in an additional specular component, the results will agree. In general if 1 percent surface reflectance component is added to the three low sets of data, there is a good agreement among all the methods of test as regards the colorimetric specifications of the T.C.C.A. samples.

There is, however, a very interesting set of discrepancies which are listed in Section 5A of the original paper. The authors have assumed that the highlights are a combination of directly reflected light from the surface and an additional component which has been subjected to passing through a thin layer of fibers and therefore has partially obtained the characteristics of the true body reflectance. This assumption was made in an attempt to explain the fact that if the arbitrary correction of 1 percent achromatic surface reflection is changed to a chromatic reflection, there will be better agreement between the visual and the instrumental results. As a consequence of this assumption, it would be true that a "chromatic surface reflectance" would be expected to be found necessary in all dichroic samples. Dichroism according to the Colorimetry Committee of the Optical Society of America is the property of a material of changing its dominant wave length as the concentration of dyestuff or as the thickness of the colored material is increased. One class of colors which is subject to this effect is browns and oranges, and a study of the samples listed in Section 5A reveals that these are all browns or oranges and therefore this explanation is a likely one. The assumption could be more critically evaluated by studying all of the samples more carefully and determining if the necessity for a chromatic surface reflectance was always associated with a color of this type.

It should be stressed that other explanations may also be offered. For instance, a study of the samples of Section 5A reveals that all of them are fluorescent. Further, all of the samples are of such a color that they are likely to have a very large proportion of the same fluorescent red which might be a red with an orange fluorescence, such as Rhodamine. Unfortunately, the dyeing formulations of these samples are not known and, therefore, this proposal cannot be directly checked. An explanation of the discrepancies based on fluorescence is that fluorescent light is a larger proportion of the total light under conditions of normal-diffuse viewing than under 45° -normal conditions. The question of fluorescence is being handled by Dr. Godlove and there is no intention to interfere with his treatment, but if the amount of fluorescence included in the measured light varies with the angle, then this must be treated in this discussion. When an exciting stream of light passes through a fluorescent material, most of the fluorescence is apparent at the point where the light first enters the fluorescent material. This is because as the light continues into the material, its flux density is continually diminished and therefore its ability to excite fluorescence is diminished. Again considering Figure 1A of the original paper, it is to be expected that the light striking the sample directly would contribute more fluorescent color than light which penetrated down into the fabric and emerged in the valleys as body-reflected light. It is, therefore, possible to assume that the fluorescence is orange in color and that a greater amount of acceptance of fluorescence occurs under normal-diffuse conditions than under 45°-normal conditions.

The above assumption can be checked immediately by observing whether other fluorescent samples also show discrepancies of this type. However, if the fluorescent color is of the same dominant wavelength as the dominant wavelength of the sample, then it will act effectively as body reflected light and no discrepancies will be noticed. Here again the samples may be evaluated critically to determine if discrepancies between visual and instrumental measurements occur on all fluorescent colors of such a nature that the dominant wavelength of the fluorescent light differs from the dominant wavelength of the reflected light.

This, then, is another explanation of the discrepancies, and either one may be right or some further explanation may be correct. As the authors have already stated, further experimentation is needed if it is desired to find the cause of these discrepancies.

It is evident, therefore, that the method of correction used by the authors is only a first approximation. As such it works well for the great majority of the samples but for the few samples listed in their Section 5A, the first approximation is not wholly satisfactory. The Munsell values obtained by instrumental methods and the ones that are adopted are probably slightly incorrect for this group of dichroic or fluorescent samples. It is impossible at this time to present better data on these particular samples because further study is necessary to find out what the second approximation correction should be.

In conclusion, while standard angular conditions of view are recognized as being important, there is no well defined and widely accepted method of viewing textile samples, and when attempts are made to evaluate accurately textile samples by instrumental methods, this lack of standard conditions means that different colorimetric results will be obtained on different instruments. In the evaluation of T.C.C.A. samples, since it was the Munsell notations which were desired, the Munsell recommended method of viewing and illuminating was accepted as standard. The measurement of the T.C.C.A. samples which at first appeared to be merely a routine evaluation has thus brought out the importance of angular conditions of viewing and now appears to be a research problem. It is very fortunate for the science of colorimetry that the T.C.C.A. arranged to have the N.B.S. measure their standards.

Hotel Accommodations

Silver Jubilee Convention

See Page P334

Benefit to Industry of MEASURED STANDARDS*

JOHN F. WARNER
Riegel Textile Corporation

THE subject allotted me to discuss at this color symposium makes me envious of the ancient soothsayer, for at least he could *claim* to have super-natural insight in predicting the future. Unfortunately, I have not his temerity—but I can foresee with assurance that industry in general and especially the textile industry will benefit greatly from the results of this constructive research in colorimetry, so ably presented today by the previous speakers on this programme. The criterion of all progress is honesty of purpose and courage to tread new paths—hence, the linking of science and industry with an interrelated color language, color definitions and established color systems—illustrates that the two currents—color science and commercial color—*can meet*, not in a whirlpool—but in clear still waters.

From the earliest development of weaving, color has played a vital part in its progress. The dyestuff producer, the dyer, the textile manufacturer have worked hand in hand down through the centuries, to produce fabrics of many colors. The aesthetic influence of the artist has brought beauty to the loom, through color and design. The ephemeral element has been for centuries the dominating factor in *commercial colors*. And while color in industry must maintain this aesthetic, this ephemeral function as a stimulus to merchandising, it should nevertheless reach out to explore the scientific elements of color and their influence on industrial progress.

This is what the Textile Color Card Association has made possible by its two years research at the National Bureau of Standards. The Association had the vision and courage to initiate and support financially this constructive piece of work. That this project was worthy of research is proved by the fact that the Bureau gave its fullest cooperation and endorsement, through its directors and able physicists, under whose supervision the Association's research associate worked on the fundamental calibration of the widely used Standard Color Card of America and the United States Army Card.

It was in 1915 that the T.C.C.A. began its long road of service to industry. It has bridged two World Wars and during all the years has continued to perform two important services—the first to forecast colors seasonally—as an industrial guide to manufacturing and merchandising—and the second, to standardize colors for the textile and allied industries. These two services are each distinct from the other. Together, they form a dual function, which I feel confident the Association will not deviate from, because through long experience it has proved successful and helpful to many branches of industry and trade. Each function has its individual place in rendering a needed service. It is to the credit of the T.C.C.A. that it has kept this cleavage, for by so doing it has been able to serve a vast number of unrelated industries with widely different color needs and problems. The Association was the first to establish commercial color standards through the medium of a Standard Color Card, of which in the past 31 years 9 editions have been published. Other nations have emulated this card—but none has ever approached its wide international usage. There is hardly a dyer, chemical manufacturer or textile mill in America which does not use this standard card. Together with the official U. S. Army Color Card, it is likewise extensively used by the purchasing departments of the Government. Hence, the importance of calibrating the colors on the ninth edition standard is obvious, as this card performs a function quite separate and apart from seasonal color cards. Industries desiring established color standards can benefit by confining their selection of colors to the standard card because of this scientific research which translates these colors into a comprehensive method of color specification and furthers even more accurate color identification.

This color specification data supplements, as has been illustrated, the American Standards Association Recommendations as well as those of the Inter-Society Color Council. Since the T.C.C.A. is a member of both these organizations and one of the founder members of the ISCC—it presages even greater progress in the future of educating the layman to the value of commerce and science joining in mutual effort to help and guide industrial color development. Likewise, an equally worthy organization—the American Association of Textile Chemists and Colorists—has joined in sponsoring this research.

In the past, however, there has been one thing which the T.C.C.A. Standards lacked. The colors of the standards had never been put on an absolute basis. Any material standard is subject to the question of deterioration. Suppose that a set of standards gets dirty by handling; then they do not represent the colors which were originally intended. Suppose that some of the samples are exposed to light and the dyes fade. Before very long, the various sets of standards which are in use in different parts of the country have all changed somewhat from these or other causes. Which then is the actual standard? It is of course possible to take a master set and seal them up in a closed box and keep them protected from the air and from light and presumably they would stay reasonably constant. However, such a set does no one any good. The mere act of taking it out of the strong box to compare it with another standard, puts it in use and therefore endangers the permanent nature of the colors.

One of the important uses of the T.C.C.A. Standards is to specify the colors used on articles of permanent interest, such as the colors in the United States flag. If the flag is to have the same red, white and blue colors all over the world regardless of where the particular fabric was manufactured, it is important that these be put on a standard basis. If the flag is to always have the same shades, then permanent specifications of the colors must be made.

The T.C.C.A. Standards being material standards are highly acceptable to the textile industry. In the past they have lacked only the permanent specification which is so desirable for reasons of record. In 1942, the American Standards Association adopted the American War

* Paper read at Discussion Session, on May 6, 1946, co-sponsored by the Textile Color Card Association of the U. S., Inc., and the American Association of Textile Chemists and Colorists at the 15th Annual Meeting, Inter-Society Color Council.

Standard for the specification and description of color. This standard describes the several methods that are necessary in any basic understanding or application of colorimetry. When this standard was drawn up it was realized that standards represented by the visually equi-stepped scales of the Munsell Book of Color bridged the gap between the aesthetic and qualitative comprehension of color employed by artists, designers and the general public, and the basic specifications employed by and necessary for the purposes of science and industry. Consequently, in this American War Standard provision was made in section 2.3 for such standards to be used in the popular identification of color. Although Z-44 states that it is because the Munsell standards were measured material standards, actually it is not because they are material standards but because the Munsell notation is based on visually equi-stepped scales of color attributes that may be directly related to results of spectrophotometric and I.C.I. measurements, that makes the Munsell notation uniquely suitable for use in the four coordinate provisions of ASA Z-44. The T.C.C.A. standards are today specified in terms of all four provisions of Z-44 and should be listed as material standards so measured in any revision of Z-44.

Another advantage of measured samples is that interpolation may be used. Occassionally it has been desirable in the past to say that a new color should be intermediate between two of the T.C.C.A. Standards. This, of course, had no exact meaning. Once a sample was no longer an exact match for one of the standards, it was anyone's guess as to how far off it was. Now, however, that the standards have been reduced to a numerical basis, when it is said that a new sample should fall half way between two standards, that means something very definite. The I.C.I. specification is known for each of the standards, and an intermediate shade can be designated if desired by taking the average of the Y values of the two standards, and taking the average of the x and y values of the standards.

Another advantage of measured samples is in the question of tolerance. In the past, it might be a matter of debate whether someone had matched one of The Textile Color Card Association Standards or not. Two men could look at the standard sample and both agree that they were not exactly alike, but one might say that the difference was inconsequential and the other might say that the difference was too great. Without measured standards, the argument could continue with no chance of settling the issue. Now, however, the two men could agree beforehand, that the Munsell renotation of the sample and standard should agree within 1/10th of a hue set, within 2/10ths of a value set, and within 3/10ths of a chroma set, and then the sample could be measured and it could be accurately determined whether the sample fell outside of the acceptable tolerances or not. Thus having measured standards is of importance in the question of tolerances.

Because the T.C.C.A. Standards have been measured scientifically and specified exactly does not mean that in order to continue to use them, the textile mills each have to own a spectrophotometer and it does not mean that the dyers and color matchers will have to become mathematicians or physicists in order to arrive at numerical specifications for their samples. As far as the general usefulness of these samples is concerned, the situation is unchanged. The use of the T.C.C.A. Standards is recommended wherever applicable to the specification of a color of textiles. It is only in cases of dispute as to whether standards have changed or not, as to whether tolerances are exceeded or not, that it will be necessary to measure the sample, which can be done at the National Bureau of Standards, and there can then no longer be any argument.

More and more, industry is seeking scientific guidance. The measured color standard in the years ahead will find greater usage as the demand for accuracy in color matching and for certain industrial requirements, grows. Once again, I do not wish to infer that all color matching will be done through the means of spectrophotometric and colorimetric determination. The "Rule of Thumb" is too old a system to be supplanted entirely by scientific measurements. The craft of the dyer, which has developed from ancient crudity to present day efficiency will not be called upon to change its technique—but the dyer will come to find, in the future, needs for establishing methods by which he can, *when standards are required*, give far more accurate matching through measurements. The "commercial" accepted matching will continue to retain its place in the vast field of dyeing—but when, I repeat, standards are required, as for instance in Government specifications, as well as in other circumstances where a lack of accurate matching may mean economic loss, then industry will be grateful for this research and its objectives.

I believe the future will witness a far greater use of spectrophotometry and colorimetry in the dyestuff and pigment laboratories, in the large dye houses of textile mills, in paper mills, in plastic laboratories, and many others, because the establishing of uniformity in their individual staple color requirements, such as so-called "Standards" they may desire to set up for their own individual "consumer" needs, will be simplified by using the scientific approach which we have learned in many ways becomes the short cut to quality and economy.

I can not emphasize too strongly that industry can not afford to shut out the "fashion" element of color—for that is the life blood of merchandising—and that is why the T.C.C.A., I am sure—has successfully promoted so-called "fashion colors"—as apart from its standards. But neither can industry ignore the fundamental needs of color standards—for they perform a different function.

Some will not recognize the worth of this research immediately, for like all pioneering projects—such as this is—progress will for some time be slow. The pontoon bridges which are joining now the shores of industry and science will be followed by permanent structures—over which will pass the layman and the technician, sure-footed in the common understanding of color. And when that day comes, industry will fully appreciate the part the T.C.C.A. and the other organizations participating in this research have played in the development of the measurement of color standards.

—♦ ♦—

TCCA Color Cards—

(Continued from Page P329)

thus serves to bring some of the advantages of having the TCCA standards available to those who do not actually have access to them.

Tables 1 and 2 taken together provide information that permits the user of the TCCA standards to apply them to color specifications given by any of the current fundamental methods.

V. SUMMARY

The colors of the samples of the Standard Color Card of America and those of the U. S. Army Color Card have been measured in fundamental terms as recommended by American War Standard ASA-Z44-1942.

Standard illuminant C, representative of average daylight, recommended by the International Commission on Illumination has been used for the adopted values.

The angular conditions to which the adopted values apply are: illumination centering on 45° to the surface of the sample with an angular spread of 50 to 70°, viewing approximately along the perpendicular to the surface of the sample. These conditions are obtainable by placing sample and standard on a table near a vertical window.

The adopted values are presented in two tables which permit users of the TCCA standards to take advantage of any color specification by current fundamental methods. These tables also permit those who do not have the TCCA standards to find the standard most closely satisfying their needs and to tell how close the match is. By table 1 the TCCA standards acquire permanent meaning; by Table 2 their colors may be conveniently compared to any color fundamentally specified.

VI. REFERENCES

[1] American War Standard Z44-1942, Specification and Description of Color, (American Standards Association, 70 E. 45th St., New York, N. Y., 1942).

[2] Federal Specification TT-P-59, Paints, Ready Mixed, International Orange, obtainable from the Superintendent of Documents, Washington, D. C.

[2a] Federal Specification TT-P-141a for Paint, Varnish, Lacquer, and Related Materials; General Specification for Sampling and Test Methods, obtainable from Superintendent of Documents, Washington, D. C.

[3] Gibson, K. S. and Keegan, H. J., Calibration and operation of the General Electric recording spectrophotometer of the National Bureau of Standards, J. Opt. Soc. Am. *28*, 372 (1938).

[4] Granville, W. C., Nickerson, D., and Foss, C. E., Trichromatic Specifications for intermediate and special colors of the Munsell system, J. Opt. Soc. Am., *33*, 376 (1943).

[5] Hardy, A. C., Handbook of Colorimetry (Technology Press, Cambridge, 1936).

[6] Hunter, R. S., A. multipurpose photoelectric reflectometer, J. Research NBS, *25*, 581 (1940); RP1345; also J. Opt. Soc. Am. *30*, 536 (1940). Abridged version in Paper Trade J. *113*, TS275 (Nov. 27, 1941).

[7] Judd, D. B., The 1911 I.C.I. standard observer and coordinate system for colorimetry, J. Opt. Soc. Am. *23*, 359 (1933).

[8] Judd, D. B., and Kelly, K. L., Method of designating colors, J. Research NBS *23*, 355 (1939); RP1239.

[9] Judd, D. B., Specification of uniform color tolerances for textiles, Textile Research *9*, 253 (1939).

[10] Kelly, K. L., Gibson, K. S., and Nickerson, D., Tristimulus specification of the Munsell Book of Color from spectrophotometric measurements, J. Research NBS, *31*, 55 (1943); RP1549; also J. Opt. Soc. Am. *33*, 355 (1943).

[11] Martens, F. F., Ueber ein neues Polarisationsphotometer, Phys. Zsf. *1*, 299 (1900).

[12] Michaelson, J. L., Construction of the General Electric recording spectrophotometer, J. Opt. Soc. Am. *28*, 365 (1938).

[13] Munsell, A. H., A Color Notation, 9th Ed. (Munsell Color Company, Baltimore, 1941).

[14] Munsell Book of Color (Standard and Abridged Edition), Munsell Color Company, Baltimore, Md., 1929; 40-hue-chart edition, 1942.

[15] Newhall, S. M., Nickerson, D., and Judd, D. B., Final report of the OSA subcommittee on the spacing of the Munsell colors, J. Opt. Soc. Am. *33*, 385 (1943).

[16] O.S.A. Committee on Colorimetry, Quantitative data and methods for colorimetry, J. Opt. Soc. Am. *34*, 647 (1944).

[17] Preparation and colorimetric properties of a magnesium-oxide reflectance standard, NBS Letter Circular LC-547, March 17, 1939.

[18] Proceedings of the 8th Session, Commission Internationale de l'Eclairage, Cambridge, England, pp. 19-29 (September, 1931)

[19] Reimann, G., Judd, D. B., and Keegan, H. J., Spectrophotometric and colorimetric determination of the colors of the TCCA standard color cards, J. Research NBS *36*, 209 (March, 1946); RP 1700; also J. Opt. Soc. Am. *35*, 128 (March, 1946).

[20] Standard Color Card of America, 9th Ed. (Textile Color Card Association of the United States, Inc., 200 Madison Avenue, New York, N. Y., 1941).

[21] United States Army Color Card, (Textile Color Card Association of the United States, Inc., 200 Madison Avenue, New York, N. Y., 1930, revised 1938, 1943).

—♦ ♦—

SILVER JUBILEE RESERVATIONS

PLANS for the Silver Jubilee Convention in Boston are progressing under the leadership of George O. Linberg, General Chairman. About September 1st, each member of our Association will receive a card on which he can specify the type of hotel accommodation desired. All requests for hotel reservations are to be handled by the Housing Bureau, 80 Federal Street, Boston, Mass. Reservations will be acknowledged from this office and assigned to various hotels which will, in turn, give a direct confirmation on each reservation. We would suggest that members do not contact the hotels directly on room reservations. The Committee feels that ample hotel space will be available.

—♦ ♦—

MEMBERSHIP APPLICATIONS

CORPORATE

Concordia-Gallia Corporation, New York, N. Y.

Pacific Mills, Lyman, S. C.

Talon, Inc., Meadville, Pa.

SENIOR

Elwood Hahn—Chemist, Tiona Petroleum Co., Philadelphia, Pa. Sponsors: A. W. Boesler, A. E. Raimo.

John Walter Huber—Salesman & Demonstrator, Onyx Oil & Chemical Co., Philadelphia, Pa. Sponsor: A. E. Raimo.

Franklin R. Macomber—Chemist, Stein, Hall & Co., Providence, R. I. Sponsors: F. G. LaPiana, G. N. Houth.

Earl L. Clifford—Supt., Uncas Finishing Co., Mechanicsville, Conn. Sponsors: F. G. LaPiana, G. N. Houth.

Raymond W. Vennell—Colorist, Goodall-Sanford, Inc., Sanford, Maine. Sponsors: C. W. Lever, J. E. Briggs.

A. C. Layton Newsom—Executive Secretary, Durene Associates of America, New York, N. Y. Sponsors: F. Stutz, J. G. Stass.

ASSOCIATE

B. A. Casey—Salesman, Pioneer Salt Co., Philadelphia, Pa.

Willard B. Stone—Chemist, Goodall-Sanford, Inc., Sanford, Maine.

Glenn H. Perkins—Research Chemist, Goodall-Sanford, Inc., Sanford, Maine.

●

CALENDAR OF COMING EVENTS

SOUTH CENTRAL SECTION:
Meeting (Tentative): September 21
(Patton Hotel, Chattanooga, Tenn.)

SUB-COMMITTEES
Meetings: September 26
(Hotel Commodore, New York City)

COUNCIL:
Meeting: September 27
(Hotel Commodore, New York City)

RESEARCH COMMITTEE:
Meeting: September 27
(Hotel Commodore, New York City)

NEW YORK SECTION:
Meetings: October 11, November 22
(Downtown Athletic Club, New York City)

NATIONAL CONVENTION:
Silver Jubilee Convention: December 12, 13 and 14.
(Hotel Statler, Boston, Mass.)

●

Membership on May 1, 1946

Section	Senior	Junior	Associate	Student	Total 1946	1945	1944	1943	1942	1941	1940	1939	1938	1937
Northern New England	410	56	58	4	528	469	402	407	398	391	349	327	311	303
Rhode Island	400	30	33	8	471	405	348	352	341	337	332	295	284	256
New York	956	88	122	1	1167	1008	817	707	651	606	538	483	451	509
Philadelphia	634	38	58	10	740	644	550	513	517	475	447	381	369	326
Piedmont	377	16	39	2	434	366	326	286	309	297	293	277	247	238
South Central	91	3	6	..	100	87	83	72	80	71	61	63	56	41
Southeastern	122	7	24	13	166	141	141	146	175	142	137	133	109	55
Mid West	245	11	30	1	287	261	209	198	194	193	180	157	158	147
Student Sections	....	....	....	50	50	14	20	56	117	80	59	51	57	41
No Section	164	37	35	1	237	199	151	122	82	87	80	71	65	55
	3399	286	405	90	4180	3594	3047	2859	2864	2679	2476	2238	2107	1871
Corporate Members	....	...	...	..	302	299	184	82	77	33	33	32	30	30
Totals	....	...	...	..	4482	3893	3231	2941	2941	2712	2509	2270	2137	1901

Members in the armed services are counted above only if subscribing to Reporter and Year Book.

PATENT DIGEST

PAUL WENGRAF

WITH this issue we are inaugurating a patent abstract service for our readers. This service will be conducted by Dr. Paul Wengraf, well-known for his work in this field.

Dr. Wengraf graduated as a doctor of chemistry and philosophy from the University of Vienna following which he spent about ten years as a colorist in various textile printing mills in Austria and Czechoslovakia. He then joined the Austrian Patent Office as an examiner in the field of textile processing and remained there for ten years.

After leaving government service he served as a textile printing expert in the Sandoz dyestuff manufacturing plant in Basle. After about ten years he left this position and edited, first in Vienna and later in Berne, reports dealing with new chemical processes and apparatus in the textile industry.

Since arriving in the United States he published a similar compendium in conjunction with the patent attorneys, Richards & Geier. In 1941 he joined the Hart Products Corp. and in 1942 he became a research chemist with the Arkansas Company.

Until 1929 Dr. Wengraf prepared a yearly review of progress in textile chemistry for the "Bulletin de la Federation Internationale des Associations des Chimistes du Textile et de la Couleur," which was published in Basle. Up to the war he contributed a monthly report to the French publication "Teintex." He has also been a contributor to the REPORTER and to "Rayon Textile Monthly."

* * *

There follows a system of identification and key numbers which will be used to classify the patents:

A. PREPARING

1. Decortication of bast fibers (flax, hemp, etc.)
2. Animal fibers
   - 01. wool scouring
   - 02. preliminary treatments (oiling, carbonizing, etc.)
   - 03. preparing for hat felts
   - 04. chlorinating (especially for printing)
   - 05. crabbing
3. Fulling
4. Sizing
   - 01. sizing
   - 02. de-sizing
5. Immunizing
6. Mercerizing
   - 01. processes and equipment
   - 02. special wetting agents for mercerizing
7. Preparing of cotton cloth and rayon fabric
   - 01. chemical: preliminary treatments
   - 02. mechanical: singeing, warping, etc.

B. BLEACHING

1. Improvements of the usual chlorine bleach
2. Bleaching with peroxides
3. Bleaching equipment
   - 01. for standard bleach
   - 02. full width bleaching and oxidation bleaching
4. Bleaching equipment and processes for animal fibers
5. Miscellaneous bleaching agents

C. DYEING

1. General auxiliary processes, stripping
2. Mordanting of fibers
3. Washing and soaping
   - 01. general
   - 02. degumming (boil-off)
   - 03. foam dyeing and emulsion dyeing
4. Dyeing with different classes of colors
   - 01. substantive and basic colors
   - 02. vat colors and sulfur dyestuffs
   - 03. Indigosols and naphthols
   - 04. mordant dyes
   - 05. aniline black
   - 06. acid dyestuffs and acid chrome dyestuffs
   - 07. special processes for ester rayons, cellulose ethers, high polymers, etc.
5. Dyestuff pastes and colloidal powders, also for printing
6. Dyeing machines of all kinds

D. PRINTING

1. General thickenings
2. Special printing processes
   - 01. vat colors and sulfur dyestuffs
   - 02. printing: reduction, reserve, discharge style
   - 03. substantive and basic colors
   - 04. Indigosols and naphthols
   - 05. mordant dyes
   - 06. acid dyestuffs and other special processes for animal fibers
   - 07. pigments, miscellaneous printing methods
3. Printing machines of all kinds
4. Spray, screen printing
5. Steaming
6. Methods of engraving

E. TEXTILE AUXILIARIES

1. From resinous products
2. From naphtha and naphtha residues
3. Fatty alcohol sulfonates and related products; condensates of fatty acids
4. Quaternary ammonium bases and amino compounds
5. Others

F. SYNTHETIC FIBERS

1. General, shaping of filament, artificial staple fiber
2. Different spinning solutions
   - 01. viscose
   - 02. cuprammonium
   - 03. ester rayon and ether rayon
   - 04. cellulose compounds containing nitrogen
   - 05. solutions of fibroin, casein fibers
   - 06. rubber, latex, resins, etc.
3. Delustering
   - 01. delustering before and during spinning
   - 02. delustering after spinning
4. Special kinds of finishes
   - 01. crepe
   - 02. others*

G. FINISHING

1. General finishing processes
2. Special finishing processes
   - 01. permanent finishes
   - 02. water repellent and water proof
   - 03. fireproof
   - 04. elastic, crease resisting, shrinkproofing
   - 05. oil emulsion, avivage
   - 06. weighting and other special finishes for silk
3. Finishing equipment and drying methods
4. Calendering, moiré, sampling of finished goods
5. Damping, moistening, conditioning
6. Raising, napping

H. GENERAL

1. Structure of the fibers, of starch, gums, etc.
2. Laboratory
   - 01. new methods
   - 02. apparatus
3. Spotting and cleaning
   - 01. aqueous agents (wet)
   - 02. non-aqueous agents (dry)
4. Colorimetry and color theory, exposure to the light
5. Management
   - 01. power plants
   - 02. materials
   - 03. interiors, air conditioning
   - 04. plant injuries
   - 05. plant difficulties and their remedies
6. Water softening, waste water purification
7. Economics, statistics

* With the exception of the finishing processes proper of rayon.

* * *

BLEACHING—PEROXIDE **B, 2**

U S. Patent 2391,710 (Buffalo Electr. Co.—Kauffmann et al,—Jan. 1, 1946)

This invention recommends a new bleaching process, differing from the well known and generally used kier-pre-boiling method. The cotton goods are impregnated wtih an alkaline solution and led into one end of an J-shaped chute. Here the goods pile up and they are heated at the same time in a steam atmosphere. At the shorter (lower) end of the J-chute the goods are withdrawn. Removal of the fabrics, being in rope-form can be carried out without tangles or snarls which frequently occur in kier-boiling process. Former devices operating with

similar J-shaped chutes had the drawback of accumulating films of insoluble silicates, hydroxides, etc., on the walls. This drawback is avoided by squeezing the fabrics in such a way that only 50-100 percent of the alkaline liquid is retained and treating it in the chute with steam. The goods fill tightly the chute so that a seal for the steam is formed on the top of the chute.

Earlier work, done in this field: Former types of J-shaped chutes for different textile treatments are described in U. S. Patent 2,253,615 (1944), and in U. S. Pat. 2,391,710 and 2,366,740 (assigned to the same company). The last mentioned two patents protect a method for bleaching fabrics, composed of unbleached and naphthol—dyed yarns. The bleaching process starts at a pH lower than 9; sodium silicate and fresh precipitated magnesium hydroxide are used as stabilizers.

DYEING CELLULOSE WITH ACID DYESTUFFS

F. 3, 04

U. S. Patent 2,391,942 (du Pont—Burke—Jan. 1, 1946)

Increasing the affinity of cellulosic materials (particularly of rayon) for acid dyestuffs is a problem which has become more and more acute because of the necessity of dyeing wool -or casein fibers with which large quantities of vegetable fibers are admixed. The present invention solves the problem by impregnating the fibers with formaldehyde (3-15 percent by weight) and a tertiary hydroxylamine salt (3-30 percent b. w.), drying the fibrous material at moderate temperatures and heating it at 90-150° C. In an example the treating liquid consists of 5 percent formaldehyde, 10 percent triethanolamine hydrochloride and 0.2 percent ammonium-chloride. It is assumed that the cellulose yarn is superficially transformed into a compound having the general formula:

Cellulose—O—CH_2O-$(C_2H_4)N(C_2H_4)_2$.HCl.

formaldehyde triethanolamine

The thus modified fibers acquired affinity for acid (Pontacyl-) and chrome (Pontachrome-) dyes but they can also be dyed with some direct (Pontamine-) dyes.

Some earlier work, done on this subject: Numerous patents recommended additions of proteins or other nitrogen-containing substances to the viscose-spinning mass. In more recent times there is more of a tendency to transform cellulose by chemical means in nitrogen-containing fibers. I. G. Farben Industrie (inventors Fink and Stahn) described in U. S. Pat. 2,097,120 how to react the xanthogenate thread before its regeneration, to cellulose-yarns with ethylene imine, a very reactive nitrogen compcund. Other suggestions were made by U. S. Patent 2,243,630 (Rohm & Haas) incorporating pyrrhol, polyamines and formaldehyde within the fiber mass or U. S. Patent 2,121,337 (1938) (Gen. Aniline), treatment with guanidines.

COLORING GLASS FIBERS

C, 1

U. S. Patent 2,394,493 (Owens Corning Fiberglas Corporation—Schoenlaub—Feb. 5, 1946)

Attempts of coloring glass in dark shades, particularly in brown, have been unsuccessful up to now. Mostly oxides of iron, copper, cobalt and manganese have been distributed within the glass batch; but only lighter shades of blue and green and rather cream and tan colored glass have been obtained. The present patent claims to obtain various dark shades from red through brown to black by using vanadium oxide (V_2O_5) dispersed in a concentration from 10-20 percent in the alkali-free glass batch. Additions of cobalt oxide give a deep henna, and of cobalt, copper, manganese and iron a black, etc.

WATERPROOFING CELLULOSIC MATERIALS

G. 2, 01

U. S. Patent 2,394,537 (Henry Dreyfus—Feb. 12, 1946)

Fibers of cellulosic material such as cotton, linen, rayon or of cellulose esters, especially acetate of cellulose, may be improved in various respects by treating them with carbylamine solutions. Chiefly they acquire waterproofing qualities. An example suggested to treat a fabric made from high tenacity cellulosic yarn in a 20 percent solution of octadecyl carbylamine, $C_{18}H_{37}$ NC in benzene, to press the fabric until it contains about 50 percent of its weight of liquor and to heat it at 110° C. for ½ an hour. The "high tenacity cellulosic yarns" are prepared from cellulose acetate yarns, stretched 10 times its length in wet steam and *completely* saponified. The fibers treated by this method have therefore no more acetyl group linked to the cellulose chain. Also unsaponified acetate rayon however may be subjected to the carbylamine treatment. The inventor obtained in 1942 two British patents 547,802—03 protecting the manufacture of these high carbylamines.

DYEING VINYON YARN

C, 4, 07

U. S. Patent 2,394,688-89 (American Viscose Corporation—Heyman—Feb. 12, 1946)

It is known that water insoluble dyestuffs, generally used in the form of suspensions for dyeing acetate of cellulose are also suitable for dyeing nylon (recent patents, assigned to du Pont and Courtaulds, for example U. S. P. 2,347,106, 2,347,143, 2,371,536 describe the application of direct dyestuffs to nylon). Now it has been discovered that Vinyon yarns (the yarns made from polymerized vinyl compounds such as polymers of vinylchloride and co-polymers of vinylchloride aand vinylacetate) may also be dyed with dyestuffs of this group, for example with products of the Cibacete-, Acele-, Celliton-, Phenacyl-, Artisil- etc., series. The operation has to be carried out in the presence of water-insoluble organic compounds, being soluble in the vinyl fiber mass at an amount of at least 2 percent, thus swelling the fiber and opening the pores. Numerous examples for organic assistants useful in the process are given so for instance diphenyl, naphtalene, naphtole, aromatic ketones.

Earlier Reference: Vinyon fibers can be dyed by another process according to U. S. P. 2,359,735 (1944), assigned to Am. Cyanamid Co.: oil-soluble dyestuffs (of the azo type) are used for dyeing by pasting them with different plasticizing agents (amylphthalate) and emulsifying this paste in the presence of protective colloids such as ammonium caseinate.

SHRINKPROOFING WOOL CONTAINING TEXTILES

G, 2, 04

U. S. Patent 2,395,724 (Tootal Broadhurst Lee Comp.—Cowley—Feb. 26, 1946)

Textile materials consisting wholly or partly of wool are reduced in their tendency to felt by treating them with organic or inorganic compositions which are subsequently insolubilized. The inventor calls these compositions "potential resists." Examples of these "potential resists" are condensates of urea, thiourea, cyanamide, melamine combined with formaldehyde and cured as usual. Also entirely inorganic compounds may be applied such as the synthetic resin, obtained by polymerizing phosphonitrilic chloride . . . $(PNCl_2)_x$- . . . The insolubilizing aftertreatment consists of applying one of the known antifelting agents such as chlorine or bromine or any halogen developing compound (for instance hypochlorite in organic solution). The invention combines therefore the resin-shrinkproofing method with the halogen-treatment.

Earlier work done in this field: U. S. Patent 2,382,632 (Ellis Foster—Rust—Hassel) discloses the possibility of shrinkproofing by using secondary amines or quaternary ammonium compounds. Resin finishes preventing wool shrinkage: see U. S. Patent 2,329,622 (1943) Am. Cyanamid Co.) protecting the use of melamine and fomaldehyde. Brit. P. 569,730 (Raynes-Stevenson) recommends treatment with chlorine and permanganate. Further references: see the article of A. D. Nute in Am. Dyest. Rep. April 23, 1945, p. P. 167.

SHRINKPROOFING WOOL

G. 2, 04

U. S. Patent 2,395,791 (Cluett, Peabody & Co.—Pfeffer & Kitaj—Feb. 26, 1946)

Another patent, disclosing a method

for shrinkproofing and stabilizing wool has been issued the same day as the aforementioned Tootal patent. The inventors refer to prior methods such as halogen—, alkali—or resin-treatment and quote also the above-discussed Tootal—Cowley-process. In criticizing this last invention they claim that the resin resist interferes with the action of halogen which is only applied after curing the resin. A better solution of this problem is said to be obtained by first treating the wool material with an alcoholic caustic potash —or soda-solution and thereupon with a resin forming, stabilized pre-condensate of urea-formaldehyde (Example Beckamine P-424 from Reichhold Chemical Co.) The alkaline treatment has to be stopped when the wool has lost approximately 16.7 percent of its initial strength. The concentration of the resin solution is limited with 6 percent solid content. It is stated that neither of these solutions by itself has any shrinkproofing effect but that they are very efficient when applied one after the other.

Earlier References: Caustic alkalies as shrinkproofing agents have first been described in Brit. P. 549,629 (Bleacher's Association): strong alkalies can be used under controlled conditions while weaker alkalies have a detrimental effect on animal fibers. Alcoholic caustic solutions are described in Brit. P. 538,428 (Tootal Broadhurst Lee Co.)

SHRINKPROOFING WOOL G, 2, 04

Brit. P. 572,041 (du Pont—Cline—Signaigo—Sept. 20, 1945)

The patent protects a process for imparting shrinkproofness by a treatment with a mercapto alcohol in aqueous solution; the solubility of this compound in water should be at least 0.5 percent. In an example, wool flannel (26 p.) is suspended in a solution containing 7.5 p. = 1.5 percent *thiosorbitol*, 230 p. water and 2.37 p. 0.1 n/NaOH for an hour at 26° C. The fabric is rinsed and dried. Its tendency to shrink is reduced 24 percent by this treatment.

TEXTILE DRYING DEVICE G, 3

Brit. P. 572,113 (REAVELL—Sept. 24, 1945)

An improved method for evaporating water or solvents from cloth and other textile material is described in this patent. The fabric to be dried is carried along an accurate path by and on the surface of a rotating drum, constructed from a translucent material such as glass or quartz. At the inside of this drum infrared ray generators are arranged emitting rays in the wave length of 10,000-50,000 Angstrom. Details for producing these rays are disclosed in the specification. The purpose of this invention is to provide a means of drying where a direct contact of the fabric with an overheated metal has to be avoided.

NYLON FIBERS, INCREASING RESISTANCE TO LIGHT F, 2, 06

Brit. P. 572,136 (du Pont—Sept. 25, 1945)

Fibers derived from synthetic linear polyamides (nylon) resemble silk in that their resistance to light is not so high as that of other fibers such as regenerated cellulose. Degradation of the fibers can be observed when this material is worked into garments, draperies, etc., and exposed thereafter to light. Phenols have already been proposed to prevent this degradation but they are easily removed by laundering. It has been discovered that *catechol* or its derivatives, insolubilized by a formaldehyde aftertreatment import the desired resistance to light to the nylon products.

CELLULOSE GLYCOLLIC ACID G, 2, 01

Brit. P. 572,868 (Oel & Chemie Werke Hausen, Switzerland—Oct. 26,, 1945)

Cellulose glycollic acid is prepared from alkali cellulose and monochloracetic acid and is used as a finishing agent, since the metal salts of this acid (excepting the alkaline salts) are difficultly soluble in water. Moreover it has been used as an addition product to soaps and other detergents. The new method for preparing this product in a practically salt-free state consists of reacting the alkali cellulose with relatively low quantities of monochloracetic acid and an excess of NaOH while reducing the water content of the reaction's mixture to 50-100 percent of the dry cellulose.

IMPREGNATING FABRICS WITH POLYMERS G, 2, 01

Brit. Pat. 572,959 (Imp. Chem. Ind.– Charlton—Oct. 31, 1945)

A permanent finish is produced by impregnating a fabric with persulfate and hydrosulfite or a similar catalytic mixture and exposing it thereupon to the vapors of readily polymerizable liquids which contain the group CH_2: C = (for instance methylacrylic acid) .CO_2 gas is bubbled through this liquid, the vapors of which are polymerized upon the fiber. A fabric resembling oiled silk is obtained. The Brit. P. 572,995 of the same Company (issued on Nov. 1, 1945) protects an inverted process: the fabrics are first impregnated with an emulsion of acrylate compounds and thereupon padded with a persulfate solution. Also in a quite similar way the method of Brit. P. 573,270 recommends to polymerize first the acrylic compounds in aqueous solutions with persalts and an oxygen acceptor (see above), impregnating with an emulsion of these products.

ABSTRACTS FROM CONTEMPORARY JOURNALS

WOOLEN AND WORSTED PIECE DYEING

W. H. Wadsworth, Textile Manufacturer, page 96, Vol. 72, No. 854, February, 1946.

If worsted pieces have been well scoured, i.e., have had all the dirt and soap removed, there is not much danger of unevenness, cloudiness or streakiness. If there is any iron present, shown by rust spots, a run in oxalic acid is advised and dyeing in an acid bath. Cold water should not be used at the end of the scouring process but rather warm water which is gradually cooled down.

Sometimes small specks appear on indigo-dyed cloths. They may be eliminated by boiling out the pieces previous to vatting.

When a sweet dyeing method is employed there is a danger of the pieces not being too well dyed through. If this can be anticipated, sulfate of ammonia can be added to the dyebath to bring the bath on the acid side. If the pieces are suitable the chrome-off method can be used, where the acid is added at the commencement of dyeing.

With soft water any type or method of dyeing may be used. With hard water care has to be taken in the selection of dyestuffs, relying to a great extent on acid dyestuffs.

For light shades on decorated cloths fast acid colors are recommended, and for darker ones the chrome-off process. Good results are obtained by the metachrome process. Blue or navy may be obtained with the Coomassie or sulfon cyanine group.

Marks are often caused while running in rope form. It is suggested that after each rope-form process the pieces be opened out to prevent against running in the same groove in the next process. Methods of removing marks include: decatizing after dyeing, a slight raising, a few rounds on the milling machine or a run on the stretching machine.

Streakiness can be caused by running slow during either scouring or dyeing.

Light stains may be resist stains, metal stains, or be caused by dabbing greasy pieces with a solvent previous to dyeing.

High class all-wool fabric should not cause much trouble if properly prepared. Boucle, crepe, and ribbed cloths are best dyed acid, using a low winch at a slow

speed.

Too long a washing-off after carbonizing following dyeing may cause the pH values to be too near neutral and cause color migration.

For tone-in-tone or two-colored effects the previously dyed yarn or loose wool must first be fast to scouring and acid cross-dyeing. Before dyeing the material should be well scoured.

In dyeing unions with ordinary union dyestuffs, boiling for the purpose of levelling is not necessary and dyeing is best carried out at 90°C. It may be helpful to use a resist for the wool when using cold dyeing colors. Many other hints for dyeing unions are given.

NYLON HOSE—PREBOARDING, DYEING AND FINISHING

The Textile Manufacturer, page 88, Vol. 72, No. 854, February, 1946.

This article describes the construction and operation of a pre-boarding machine (Pegg Paramount Preboarding Machine), as well as the machinery used for dyeing, drying and finishing of nylon hose.

DYEING SERGE PIECE GOODS

The Dyer and Textile Printer, page 305, Vol. XCV, No. 7, March 29, 1946 and page 355, Vol. XCV, No. 8, April 12, 1946.

To reduce liability to distortional defects light-weight worsted serge fabric should be carefully crabbed and set before being scoured. The temperature should be slightly higher than the maximum to be used during subsequent operations. If the dyebath should become hot enough to cause the wool fiber to become softer and more plastic, serious distortional defects are more likely to occur in a neutral or weak acid dyebath than in one containing reasonably strong acid. To reduce the tendency of the more crisp and springy qualities of serge fabric to distortion, the scourer can: eliminate ammonia and soda ash from the scouring bath and use as a detergent a suitable combination of soap and a proprietary degreasing preparation of the sulfonated alcohol type; use a long bath to insure slight floating of the coils of fabric; cool the fabric off gradually when the detergent is being flushed out of the goods.

To obtain a more thorough setting than is possible by merely putting the pieces through the crabbing machine it is suggested that the goods, after being crabbed in the usual manner, are tightly wound in open-width order on perforated stainless metal rollers, which are then placed in a tank containing water close to the boiling temperature. The goods are left in the hot water bath for several hours and are afterwards allowed to cool down on the rollers.

Serges that are carbonized by the wet acid process after being set and scoured are very often troublesome to dye. Many dyers in handling such pieces do not neutralize the goods before dyeing them with acid colors or with dyestuffs containing chromium. Chrome colors of outstanding fastness such as the true alizarines are seldom used in dyeing such pieces but preference is given to acid colors possessing an excellent levelling property despite the low fastness to light usual in certain cases. A list of suitable dyestuffs is given.

Serge goods that have not been carbonized are no more difficult to dye level than any other all wool or worsted piece goods.

Inexpensive serge goods containing a portion of shoddy from which vegetable fiber has been removed by carbonizing give the most difficulty in obtaining a level shade. When residual carbonizing acid is suspected in the pieces it is recommended to omit the use of soap in the scouring and use a detergent containing a sulfonated fatty alcohol. The pieces are then washed off thoroughly in running hot water and allowed to cool down gradually. After hydroextraction, the goods are dyed without first drying. Level dyeing acid colors suitable for application in a strongly-acidified bath should be used for these low grade serges. This fabric may be stiffened with a solution of farina in a piece goods washing machine after dyeing.

DYEING ACETATE RAYON AND ACETATE VISCOSE RAYON UNIONS

E. Walters, The Dyer and Textile Printer, page 323, Vol. XCV, No. 7, March 29, 1946.

Dispersed dyestuffs, consisting essentially of insoluble organic bases, were found to possess very high affinity for cellulose acetate and gave dyeings of good all-round fastness. This class of dyestuff has been extended by the discovery of many more of similar properties and the range now at the disposal of the dyer is very large. In dyeing acetate rayon with dispersed dyestuffs it is necessary, first, to maintain a fine state of dispersion; secondly, the dispersed dyestuffs are not salt sensitive and dyeing proceeds to completion unaided; lastly, the effect of temperature is more marked than when direct dyestuffs are applied to viscose rayon or cotton. Among the dispersed dyestuffs, diazo blacks are extensively used on acetate rayon.

A more recent development is the production of water-soluble (Solacet) dyestuffs for acetate rayon. They are applied in a manner similar to that of direct dyestuffs on natural cellulosic fibers. Control of the rate of dyeing and degree of exhaustion is effected by suitable quantities of common salt. Without salt, these dyestuffs have very little affinity. It is stated that the range of shades obtainable is somewhat restricted owing to the lack of a really first class jig dyeing blue.

There follows a discussion of gas fume fading and change of shade encountered on acetate rayon dyed fabrics.

In acetate viscose rayon unions for white and color and two color effects the dyestuffs used for covering the viscose must leave the acetate virtually unstained. The direct and dispersed dyestuffs required for dyeing such unions may be applied from the same bath with necessary precautions. With water soluble dyestuffs good effects can also be obtained. Where solid shades are desired direct dyes may be used to cover the viscose. Where vat dyes are used to color the viscose rayon, the number of suitable dyes are restricted to those which are capable of being applied at low temperatures from a bath of low alkaline content.

THE DYEING OF HESSIAN

The Dyer and Textile Printer, page 349, Vol. XCV, No. 8, April 12, 1946.

This article discusses the application of vat and azoic colors to hessian, a coarse fabric of jute.

The degree of scouring and bleaching depends upon the type of shades to be dyed. For large quantities the scouring is carried out in the kier; for small quantities it may be done on the jig. Chemicking is followed by a thorough rinsing and, if necessary, an antichlor treatment followed by further rinsing and neutralization.

Vat dyeing may be done on the jig but this is least satisfactory because penetration is bad and little dyeing takes place where the warp and filling cross. Further, the filling threads take up more dye than the warp threads. Best results are obtained by the pigment padding and jig-dyeing process. The dried hessian is padded through a dye liquor containing the unreduced vat dyestuff dispersed with a suitable padding oil and is then wound round a roller and removed to the jig for reduction. Ten to twenty passages are given through the reducing solution, followed by rinsing, oxidation and soaping. Dyeing costs are rather high by this method and a saving in dyestuff may be made by using a part-way pigment padding process in which only about half of the dyestuff required to obtain the shade by pigment padding is applied in the padding machine and final additions of dyestuff are made in the reducing bath. Representative recipes are given.

Azoic colors may be applied by processing throughout on the jig; the color may be applied by padding, first in the naphthol then in fast color salt solution after drying; or the naphthol may be applied on the jig and then developed on the padder after drying.

DYEING GARNETTED WOOLEN AND WORSTED WASTE

The Dyer and Textile Printer, page 397, Vol. XCV, No. 9, April 26, 1946.

Garnetted woolen and worsted waste reaches the dyer in the form of bundles or batts, about a yard long and a foot in thickness. The batts are generally re-dyed without being unrolled as there is less tendency of the fibers to felt in this form. The dyeing machine used allows the stock to remain stationary while the dye liquor circulates. Any oil present must be removed before stripping and dyeing. One method of simultaneously degreasing and partly decoloring the stock consists of treatment for about 20 minutes in a boiling bath containing about 2 per cent of soda ash. Hydrosulfite compounds may be used to remove acid colors. Chrome dyestuffs of the fast alizarine type are difficult to remove. A usually effective but rather costly method for removing these chrome colors consists of boiling for 20 minutes in a bath containing 10 per cent of yellow spirits of salt. After washing in cold water the goods are treated at, or near, the boiling point in a fresh bath containing ammonia.

Garnetted worsted waste on which the necessary ground shade has been produced is commonly re-dyed with chrome colors. Acid colors and acid milling colors are also used. Garnetted woolen waste frequently contains cotton. When the cotton is colored the stock is degreased in a boiling solution of soda ash, washed off, and then treated in a boiling bath containing a hydrosulfite compound. Commercial union dyestuffs, suitable for after-treatment with bichromate to improve the fastness of the shade to scouring and milling, are used by a number of dyers for re-dyeing garnetted wool/cotton union waste. Sometimes the stock is re-dyed with a union dyestuff containing suitable proportions of neutral acid color of the acid milling type and normal direct cotton dyestuff possessing no special fastness to alkaline washing or milling. Bleeding of the dyestuff from the animal and vegetable fibers in pieces containing the garnetted stock is less pronounced when the pieces are milled in acid solution than when milling is performed in soap solution. Garnetted waste containing viscose rayon is re-dyed in the same manner as stock containing cotton. When acetate rayon is present a percentage of acetate rayon dyestuff is incorporated in the union dyestuff.

NEW METHOD OF VAT DYEING YARN PACKAGES

The Dyer and Textile Printer, page 403, Vol. XCV, No. 9, April 26, 1946.

A new process for the application of Caledon dyestuffs to yarns in package form has been developed in the laboratories of the Dyestuffs Division of Imperial Chemical Industries, Ltd. It is known as the Abbot-Cox process.

The essential steps are as follows:

(1) The necessary Caledon dyestuff, in Paste Fine form, is made up as a fine dispersion, using a suitable dispersing agent, and this liquor is then circulated through the packages or pack in the machine.

(2) The dyestuff in the liquor is then exhausted by the gradual addition of an electrolyte such as common salt or Glauber's salt.

(3) The dyestuff so applied is then reduced by the addition of normal reducing agents.

(4) Dyeing is completed by developing and soaping in the normal manner.

SHRINK-PROOF FINISH ON WOOL/RAYON MIXTURES

The Dyer and Textile Printer, page 417, Vol. XCV, No. 9, April 26, 1946.

This article compares the advantages and disadvantages in the use of the following processes: (1) use of active halogens, such as chlorine and bromine; (2) strong alkalis such as caustic soda; (3) strong acids like sulfuryl chloride; and (4) synthetic resins.

TRADE NOTES • NEW PRODUCTS

• DEXTER MERCERIZATION BOOKLET

"Variations in the removal of pectic substances from cotton yarn in the mercerization process," a booklet just issued by the Textile Chemical Division of the Dexter Chemical Corporation, is the fourth of a series of reprints by the corporation's Technical Director, Sidney M. Edelstein.

In this booklet Mr. Edelstein discusses variations in the removal of pectic substances from cotton yarn in the mercerization process as a source of dye affinity variation in mercerized yarn.

Copies will be sent upon written request to Dexter Chemical Corporation, 819 Edgewater Road, New York 59, N. Y.

• ADDITION TO L.T.I. EQUIPMENT

Professor Elmer E. Fickett, in charge of the Chemistry Department at the Lowell Textile Institute, reports the recent addition to the laboratory facilities of a large stainless steel dye kettle, the gift of the James Hunter Machine Co. of North Adams, Mass.

One of their newest models, it was presented by the Hunter Co. complete with motor and accessories and forms a valuable addition to the Institute's chemical equipment which is being currently modernized and expanded.

• COLUMBIA ACTIVATED CARBON

A new booklet, "Columbia Activated Carbon," is of interest to those who require activated carbon for solvent recovery, for purification of air or gas, or as a catalyst carrier. Several types and grades of "Columbia" activated carbon have been especially developed for specific uses; all are characterized by a high adsorptive capacity, selective adsorption of organic vapors in preference to water vapor, and are highly efficient under the conditions of use. Specifications, as well as suggested applications, are described in this booklet. Copies may be obtained from Carbide and Carbon Chemicals Corporation, 30 East 42nd Street, New York 17, N. Y. Ask for Form 4712.

• QUARTZ COMPANY 115 YEARS OLD

The Philadelphia Quartz Company, General Offices in Philadelphia, marks its 115th anniversary in business on July 21st. From the humble soap and candle factory established in 1831 by Joseph Elkinton, Philadelphia, the enterprise has developed into a national producer of silicates of soda with plants in Anderson, Indiana; Baltimore, Maryland; Buffalo, New York; Chester, Pennsylvania; Jeffersonville, Indiana; Kansas City, Kansas; Rahway, New Jersey; St. Louis, Missouri, and Utica, Illinois.

Early in the 1860's the Elkinton firm began to manufacture silicate of soda for use in their soaps. Other soap manufacturers, learning of the improved qualities of soap made with silicate, turned to the Elkinton plant for supplies.

The present firm name, Philadelphia Quartz Company, was first used in 1864 when a partnership was formed to produce silicate of soda in a separate plant. Soap manufacture was discontinued in 1904 and silicates of soda became the chief products. From the original use in soap manufacture, silicates have found wide application in various industries as adhesives, detergents, binders, colloids, coagulating and deflocculating agents, protective films, inhibitors, gels. On the eve of its hundredth anniversary in 1931, the Company introduced two new industrial

alkalies, sodium metasilicate and sodium sesquisilicate.

Thomas W. Elkinton, great grandson of the founder, Joseph, is now President of the Company. Besides the nine plants of the Philadelphia Quartz Company, three plants located at Berkeley and Los Angeles, California, and Tacoma, Washington, are operated by a subsidiary, the Philadelphia Quartz Company of California, Ltd. A Canadian subsidiary is National Silicates, Ltd., with offices and plant at Toronto.

● STARTS OWN BUSINESS

Sidney Springer, who has been in charge of the Rayon Processing Division of the Rock Hill Printing and Finishing Company, Rock Hill, South Carolina, for the past 8 years, has resigned to go into business in Los Angeles, California. Mr. Springer graduated from the Bradford Durfee Textile School, Fall River, Massachusetts, in 1927. Since his graduation, he has been actively engaged in the textile processing industry. Mr. Springer will be located at: 6000 Enest Avenue, Los Angeles, California.

● NOPCO 15-YEAR-CLUB

In an impressive ceremony at the Harrison, N. J., home office and plant, nineteen new members, representing the "Class of 1931," were inducted into the Nopco 15-Year-Club recently by Charles P. Gulick, president and chairman of the board of National Oil Products Co.

The "induction," an annual ceremony attended by all employes who have been with the firm for 15 or more years, marked the ninth anniversary of the group, which now boasts 103 members.

Highlight of this year's ceremony was the presentation of solid gold watches emblematic of 25 years continuous, loyal service, to Peter Slobodiuk, a chemical operator in the plant, and Ralph Wechsler, treasurer of the company, both of whom started work at the Harrison plant in 1921. For Mr. Wechsler, this was a "repeat performance," since he had received his watch originally last February upon completion of his 25th year with Nopco.

Mr. Gulick, in welcoming the new 15-Year-Club members, thanked them individually on behalf of the company for their loyal service and presented each employe with company 15-Year service buttons and certificates entitling them to an extra week's vacation each year, starting this summer.

New members inducted at the Harrison ceremony were Sadie Fitzsimmons, Melvin MacMillan, Charlie Moran, Joe Nothum, Bob Davis, Don Small, Harry Batley, Johnny Quinn, Logan Grupelli, Andre Briod and Bert Macintyre.

New members of the Nopco 15-Year-Club are pictured during "Induction Ceremonies" at the home office and plant. Left to right (Front Row) are: Harry Batley, Joe Nothum, Sadie Fitzsimmons, Charlie Moran, and Logan Grupelli. (Rear) Melvin MacMillan, Don Small, John Quinn, Bob Davis, Andre Briod and R. B. Macintyre.

Members inducted in absentia from the Cedartown, Ga., or West Coast plants of the company included Johnny Gammon, George Small, George Cunningham, Ernie Willis, Lloyd Stewart, Henry Smith and Edward Sutton.

One serviceman, Pat Greene, on duty in the Philippines, was also elected to membership in the club.

Among the members on the 15-Year-Club Honor Roll are Mr. Gulick, Founder of the company; G. Daniel Davis, Vice-president in charge of Consumer Products Division, who joined the company in 1916; A. A. Vetter, secretary, 1919; Ralph Wechsler, treasurer, 1921; Thomas A. Printon, Vice-president in charge of the industrial division, 1922; and Perc S. Brown, Vice-president in charge of the vitamins division, 1927.

● CERFAK F.C.

A new synthetic detergent in its Cerfak line, known as Cerfak F.C., is announced by E. F. Houghton & Co., manufacturers of oils, chemicals and leathers, Philadelphia. This product is essentially a sulfonated fatty condensate, supplied in dry flake form and readily soluble in water at all temperatures. It is said to be an excellent detergent regardless of hardness or softness of the water. Its sudsing properties are very good.

It is stated that, for chlorine bleaching, it will hold the suds well throughout the scouring and carry through the chlorine bleach bath, having no retarding effect on the bleaching. The final result is said to be a clear white with an excellent soft feel.

Cerfak F.C. can be used for scouring, bleaching and dyeing of all types of hosiery. It will be found to provide good penetration, level dyeing and a soft clean finish. An advantage in its use on hosiery is freedom from stickiness, which makes boarding easier.

● NEW VISCOSE PLANT

The Board of Directors of American Viscose Corporation on June 5, 1946 approved an appropriation for preparation of the plant site for the Company's new viscose rayon staple fiber plant at Radford, Virginia. This work, to be carried on during the balance of 1946, will include construction of a railroad bridge to connect the main railroad line with the plant, grading of plant site, construction of road from property line to plant and a storage building.

The Board authorized a viscose rayon staple fiber plant with an initial capacity of 55,000,000 pounds per year adapted to tie in with a proposed 110,000,000 pound annual capacity plant. It is hoped that construction of the plant itself can be commenced in the Spring of 1947.

● ELECTED DIRECTOR, CONTROLLERS

Franklin R. Ehmann, Controller of The Hellwig Dyeing Corporation, has been elected Director of the Philadelphia Congrol of Controllers Institute of America for the fiscal year 1946-1947.

● ANNUAL MEETING, I.R.I.

Industrial Research Institute, Inc. held its eighth annual meeting on June 6 and 7 at the Statler Hotel in Cleveland, Ohio. C. S. Venable, Director of Chemical Research, American Viscose Corporation, Marcus Hook, Pa., was elected President for the ensuing year and N. A. Shepard, Chemical Director, American Cyanamid Company, New York, N. Y., was elected

Vice President. C. G. Worthington was reappointed Secretary and Treasurer. E. W. Engstrom, Vice President, RCA Laboratories Division, Radio Corporation of America, Princeton, N. J., and J. H. Schaefer, Vice President, Ethyl Corporation, New York, N. Y., were elected to serve three-year terms on the Board of Directors.

One hundred research directors and other executives representing member companies and their guests attended the two-day meeting. C. E. K. Mees, Vice President, Eastman Kodak Company, Rochester, N. Y., was guest speaker at the dinner session on Thursday evening. He gave an informal account of his personal experiences as a director of industrial research over the past forty years.

The American patent system and industrial research was the subject of a talk by C. W. Ooms, U. S. Commissioner of Patents, Washington, D. C. He called for an objective and thorough survey of how the patent system is serving the country and pointed out the responsibility that rests on those directing industrial research to aid in working out the future of the system. Gustav Egloff, Director of Research, Universal Oil Products Company, Chicago, Ill., recounted his experiences during a recent trip through China on a technical mission sponsored by the National Resources Commission of China. He emphasized the pressing need for technical assistance there and the high regard in which the United States is held by the Chinese.

The current failings of research management were the subject of four simultaneous round-table conferences. The outline for the discussions was based on anonymous communications on the subject which had been solicited from the technical staffs of member companies. L. T. Work, Director of Research and Development, Metal & Thermit Corporation, Rahway, N. J., organized this session.

The meeting was concluded Friday afternoon with organized trips to the Firestone Research Laboratory, Akron, Ohio, and the Aircraft Engine Research Laboratory of the National Advisory Committee for Aeronautics, Cleveland, Ohio. The facilities of these modern research laboratories were inspected and a number of interesting demonstrations were viewed by the group.

• APPOINTED CHAIRMAN, A.C.S. MEETING

Dr. Fred C. Koch, director of biochemical research at the Armour Laboratories and former head of the Department of Biochemistry in the University of Chicago, has been appointed general chairman of the 110th national meeting of the American Chemical Society, which will be held in Chicago September 9 to 13. A. E. Schneider of the Armour Laboratories has been named general assistant to Dr. Koch.

• NEW CONCORDIA-GALLIA LABORATORY

Concordia-Gallia Corporation has announced the establishment of a Research and Quality Control Laboratory at its executive offices, 1400 Broadway, New York. The laboratory will be under the supervision of Donald E. Pearson, Textile Engineer, and will be part of the Technical Division headed by Charles H. Ochsner.

The new laboratory, which supplements the Corporation's two existing laboratories —one at the Modern Throwing Company Division in Bethlehem, Pennsylvania and the other at its narrow fabrics plant in Philadelphia—aims to test, evaluate and improve the corporation's current products as well as all new fabrics still in the development stage.

New weaves, new dyes and new resin finishes will be evaluated. Extensive testing will be continuous on rayon filament and spun rayon fabrics for women's and men's wear; velvets; millinery fabrics; ribbons and tapes for the lingerie and other industries, as well as for retail sale; blanket bindings; hosiery, weaving, lace and knitting yarns. The most modern laboratory equipment is being set up to test for gas fading, sun fastness, shrinkage, abrasion resistance, fastness to laundering, crock resistance and any other factors that affect the suitability of textiles for their intended uses.

In addition to the laboratory tests, the firm's quality control program plans tests by actual accelerated use of garments and other products in which its textiles are used. Where commercial dry cleaning or laundering is expected, end product samples will be sent to dry cleaning and laundering establishments, and their performance evaluated.

The Corporation, which is a member of the American Association of Textile Colorists and Chemists, The American Association of Textile Technologists, The American Society for Testing Materials and Textile Research Institute, feels that the new laboratory will be of inestimable worth in enabling the firm to cooperate with Industry in the development of voluntary standards.

• BOOK ON INDANTHRENE DYES

Recipes of the I. G. Farbenindustrie for dyeing cotton and rayon with Indanthrene dyes, as well as other useful data on Indanthrene dyes, are given in a 392-page book, now available at the cost of reproduction (photostat or microfilm) from the Office of the Publication Board, Department of Commerce.

The book (in German) is entitled *Eigenschaften und Anwendung der Idanthrenfarbstoffe* ("Properties and Application of Indanthrene Dyes"). It was published for the exclusive use of I. G. Farben personnel. A copy was brought to the United States by Thomas R. Smith, textile finishing investigator for the Office of the Quartermaster General, U. S. Army.

In addition to dye formulas, the work presents methods of producing uniform dyeings with indanthrene dyes and describes the properties and dyeing characteristics of the dyes. Extensive tables, listing the properties, are included.

Orders for copies of the book (PB-19933; photostat, $37; microfilm, $6) should be addressed to the Office of the Publication Board, Department of Commerce, Washington 25, D. C., and should be accompanied by check or money order, payable to the Treasurer of the United States.

• NEW HEADQUARTERS, STANDARD FABRICATORS

Standard Fabricators, Inc., manufacturers of the famous Obermaier steam textile dyeing machine, have just completed and moved into their new building and plant at 355 Walton Avenue, New York City. Further information concerning the new facilities available will be published in a future issue.

• HATCH PRICE LIST

Hatch Textile Research, 25 East 26th Street, New York 10, N. Y., has released its 1946 price list. There have been no changes in price over last year.

• CHEMICAL SALESMEN'S GOLF OUTING

An outing of the Salesmen's Association of the American Chemical Industry, Inc., will be held on September 19th at the Plandome Golf Club. A floor show and other attractions will be presented. John Seidler is chairman of the Entertainment Committee.

• OFFICERS, M.C.A.

The Manufacturing Chemists Association of the United States elected officers and 15 executive committee members at its annual meeting on June 6.

Charles S. Munson, chairman of the executive committee, U. S. Industrial Chemicals, Inc., was elected president to succeed H. L. Derby, president of the American Cyanamid and Chemical Corp.

Leonard T. Beale, president of the Pennsylvania Salt Manufacturing Company, Philadelphia, and H. O. C. Ingraham, vice president of the General Chemical Company, were elected vice presidents.

J. W. McLaughlin, Carbide and Carbon Chemicals Corp., was named treasurer, and Warren N. Watson, Washington, D. C., was re-elected seretary of the Association, which maintains its headquarters in Washington.

The Association, an organization of some 80 chemical corporations, elected the following executive committee:

George W. Merck, president of Merck and Company, chairman; Lammot du Pont, chairman of E. I. du Pont de Nemours, vice chairman; Mr. Derby; C. S. Hosford, Jr., president of the Victor Chemical Works; John L. Smith, president of Charles Pfizer and Company, Inc.; Clyde D. Marlatt, vice president of the Martin Dennis Company.

W. S. Landes, vice president of the Celanese Corporation of America; P. T. Sharples, president of Sharples Chemicals, Inc.; H. I. Young, president of American Zinc, Lead and Smelting Company; and William M. Rand, president of Monsanto Chemical Company.

● NEW TYPES OF "CEGLIN"

Sylvania Industrial Corporation has developed new types of "Ceglin" cellulose ethers which greatly increase the range of uses of these textile finishes.

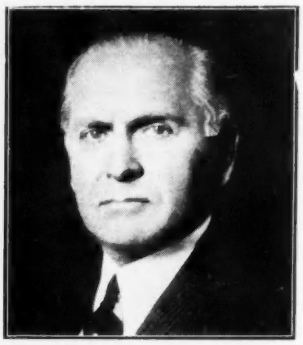
The new types are soluble in dilute alkali solutions and, because of this low alkali concentration, they may be used for finishing acetate rayon and in the treatment of viscose rayon fabrics, in adhesives, paper sizes, as dispersing and thickening agents for pigments and dyes, and for paper and textile printing.

In addition, they permit a compounding with rubber latex, with natural and artificial latices, starch, casein and the like. Covered by U. S. Patent 2,388,764, which was issued to Dr. Frank H. Reichel and Dr. Ralph T. K. Cornwell, and assigned to Sylvania Industrial Corporation, they are sold under the trademark "Ceglin" ES.

● FELTAN

Unique non-skid and surface gripping power is claimed for a new microporous sheet material recently announced by the American Felt Company, Glenville, Connecticut, under the trade name Feltan.

Feltan, described by research workers of the Company as felt in reverse phase, is a product of saturation and subsequent chemical and mechanical processing. Fibers originally present in the felt are replaced by interlocked tubular pores of the same surface character, distribution, and diameter as the wool, cotton, or synthetic fibers used in the felt blend. The interstices of the felt, as a result of impregnation, become the matrix or solid phase of the product. Permeability and porosity are subject to close control, and may be made uniform or variable from surface to surface. Physical and chemical properties are dependent on the nature of the impregnant used and may be adjusted to meet a wide variety of uses.



Edwin M. Allen, who retired on June 10th from his post as Chairman of the Board of the Mathieson Alkali Works, Inc. He will continue as a director. Mr. Allen joined the Mathieson organization in 1919 as President and devoted himself to a seven year plant rebuilding program and a plan for selling chemicals directly to users. He was elected Chairman of the Board of Directors in 1934 and continued to hold also the office of President until January 1, 1944. With his retirement as board chairman, the office is being eliminated.

During World War I and the early part of World War II he represented the chemical industry on the National Industrial Conference Board. From 1936 to 1939, he served as President of the Manufacturing Chemists Association. During World War II, he served on the Chemical Advisory Committees of the Army-Navy Munitions Board and as a member of the Advisory Board to the Chief of the Chemical Warfare Service.

Commercially available types of Feltan include "non-slippant" Feltan in Neoprene, Perbuna, or Buna S modifications; and a split leather-like material. Both are furnished in cut part form or in continuous lengths up to 20 yards, 36 inches wide. Thicknesses range from 1/32 inch to ⅛ inch. Standard colors are presently limited to red, brown, tan, black, grey, and white.

Feltan is recommended by the manufacturers for use where positive non-slip or high surface gripping power is required against lateral stress or thrust. As a base covering material it is applied by cementing with rubber, glue, or synthetic base adhesives.

● SYNTHETIC FIBERS IN GERMANY

The Textile Research Institute, Inc., 10 East 40th Street, New York, is publishing a report on "Synthetic Fiber Developments in Germany." The report was prepared by the Synthetic Fibers Team of the Technical Industrial Intelligence Committee. The information was integrated and edited by LeRoy H. Smith of the American Viscose Corp.

The report discusses synthetic fibers from raw material to finished product and also gives the chemical composition and manufacture of synthetic films and coatings. Photographs of machinery, sketches and drawings of plant layouts, new testing devices, and photomicrographs of animalized fibers are also included.

This report, of over one thousand pages, is planned for distribution in August at $10.00 per copy. Inasmuch as a limited edition is being printed, it is suggested that orders be sent in promptly.

● PUBLICATIONS OF THE SOCIETY OF DYERS AND COLOURISTS

The Society of Dyers and Colourists, 32-34 Piccadilly, Bradford, England, will shortly be issuing three publications:

(1) A revised edition of Clayton's Tables for the Identification of Dyes on the Fiber; Price $2.50, post free in the U. S. A.

(2) Proceedings of the Symposium on Fibrous Proteins; Price $6.00, post free in the U. S. A.

(3) A text book, "Wool Dyeing," by C. L. Bird, Assistant Editor of the Journal of the Society and Lecturer in Dyeing at Leeds University; Price $3.00, post free in the U. S. A.

Orders are now being accepted for these publications and should be accompanied by a remittance drawn on a registered sterling account in the U. S. A. and made payable to the Society at the Midland Bank Ltd., Market Street, Bradford.

● BANGOR MILLS EXPANSION

Bangor Mills, Inc. is doubling the size of its finishing capacity by installing new modern equipment. In addition they are doubling the knitting capacity by installing new high speed warp knitting machines with the necessary auxiliary equipment.

Expansion of the building at their Pen Argyl Plant is now in progress to house this new equipment. The completion of the installation of these machines will be in January of 1947, and will represent a cost of approximately $250,000.00.

As soon as this program has been completed a second expansion program will be started and for this second program Bangor Mills, Inc. has already purchased additional land adjacent to the present plant.

During the war Bangor Mills, Inc. converted over thirty million yards of warp-knitted goods annually, for all branches of the Armed Forces.